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Relationship between Emotion and Teaching-Learning Processes

Relação entre emoção e processo de ensino-aprendizagem

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Abstract

The article presents the state of knowledge about the incidence of emotion in the teaching-learning processes. For its construction, in addition to consulting authors who have become classics, the production of 72 scientific articles published in recent years in high-impact journals in ISI and SCOPUS was analyzed. The research was organized based on the categories relationship between emotion and learning and the incidence of emotion in pedagogical practices, evidencing the advance in knowledge, gaps and research challenges on the subject.

Keywords: Emotional Experience, Emotional Response, Learning Processes, Teaching Processes, Education.

Resumo

O artigo apresenta o estado do conhecimento sobre a incidência de emoções nos processos de ensino-aprendizagem. Para sua construção, além da consulta de autores constituídos como clássicos, foi analisada a produção de 72 artigos científicos publicados nos últimos anos em periódicos de alto impacto no ISI e no SCOPUS. A pesquisa foi organizada a partir das categorias relação entre emoção e aprendizado e incidência de emoção nas práticas pedagógicas, evidenciando o avanço do conheci- mento, lacunas e desafios de pesquisa no assunto.

Palavras-chave: Experiência emocional, resposta emocional, processos de aprendizagem, processos de ensino, educação.

Introduction

Emotions are short-term individual phenomena, which include an affective, cognitive, physiological, motivational and expressive component, and they tend to dominate our consciousness (Palmer, 2017). Emotions incite action (Lazarus, 1991), are a guide that allows us to interpret the world around us (Jokikokko, Uitto, Deketelaere, Estola, 2017) and are mediated by social and cultural structures (Timoštšuk, Kikas and Normak 2016) .

In the school context, children must achieve certain learning and although several authors (Pekrun, Goetz, Titz, Perry, 2002; Schutz and Pekrun, 2007; Gläser-Zikuda, Stuchlikova, Janik, 2013; Morcom, 2014, Chabot and Chabot, 2009; and Bisquerra 2009) have advanced with evidence on the incidence of emotions in these achievements, such information is still limited and has not managed to overcome the predominance of the cognitive that exists over learning in educational environments (Mellado *et al.* . 2014, Neville, 2013, cited by Fried, Mansfiel, and Dobozy, 2015).

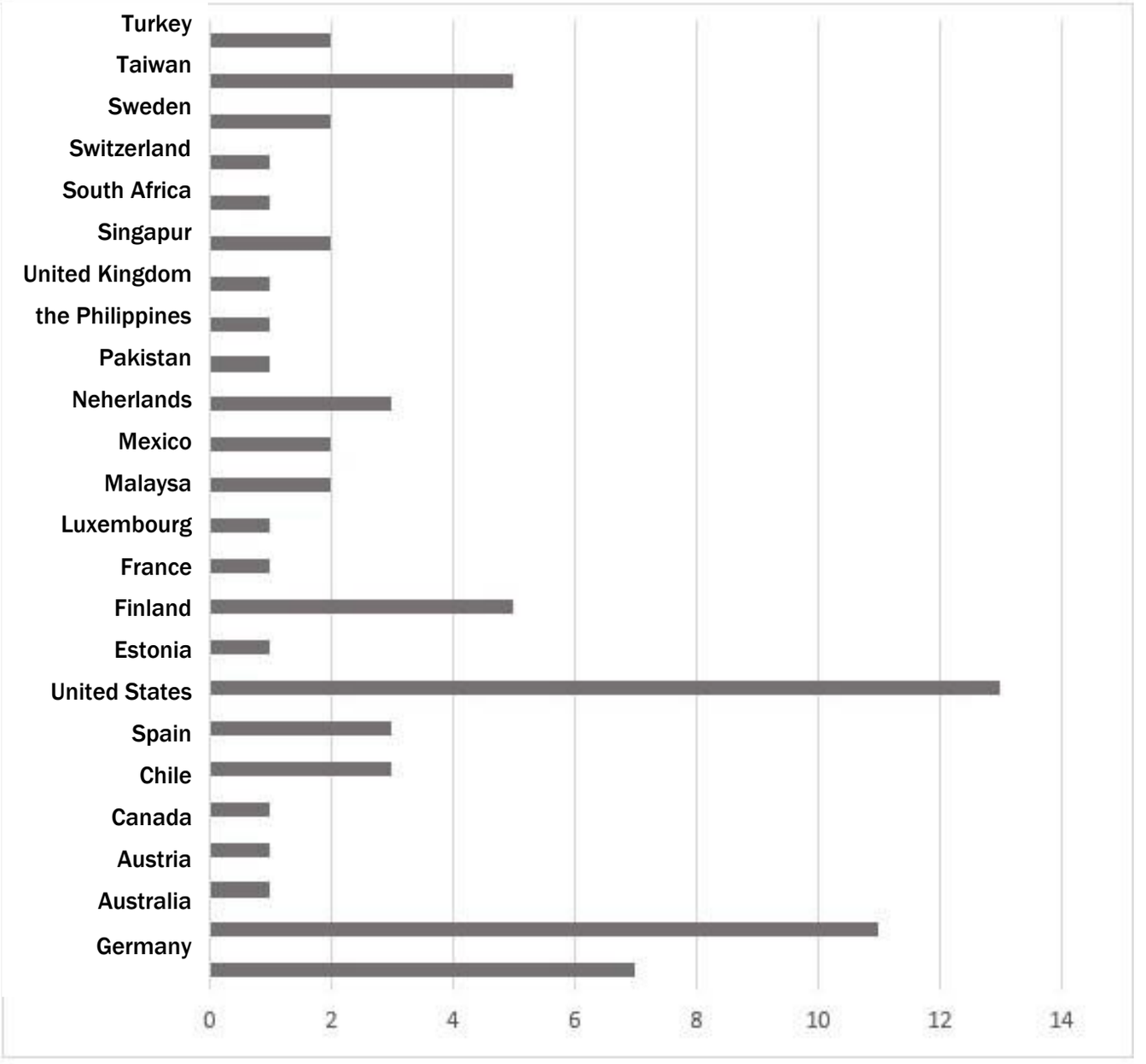
With regard to theorizing on the subject, advances have been made with respect to students' emotion, and the control-value theory of achievement emotions has been one of the most promising models (Pekrun, 2006). In this theory, it is pointed out how control, expectations of success and value given to academic activities or results provokes emotions of achievement. Thus, if a student feels secure in mastering a material and finds it interesting, they will tend to have positive emotions such as enjoyment; If not, emotions such as anger and frustration may emerge. In addition to the control-value theory, there is the sociocultural theory that, in Morcom's words, highlights the power that sociocultural practices of educational contexts have in learning processes (Morcom, 2014) and motivational theories in which it is highlighted motivation as an element that affects the academic success and well-being of the subjects (Orsini, Binnie and Wilson, 2016). Thus, the greater the motivation, the greater the internal regulation and self-determined behavior, the greater the pleasure and satisfaction. Regarding the emotion of the teacher, there are no precise theoretical advances on the subject (Fried et al. 2015); however, there are contributions on the implications of incorporating the emotional component in the teaching didactics of each teacher, or Pedagogical Content Knowledge -PCK- (Shulman, 1986). Against this, Mellado et al. (2014) highlight that the PCK is a form of reasoning and didactic action, in which it is necessary to include emotion to generate effective learning processes. So if a teacher is aware and reflective about the emotions that his subject generates, in a content or in his own way of teaching, he will generate effective learning processes in his students, avoiding obstacles and limitations in this process.

Methodology

In order to propose a category scheme that allows covering the wide spectrum of knowledge that is being generated, in addition to the classical authors, the production that was made on this topic between 2014 and 2017 was analyzed. 72 of 105 identified articles were considered in indexed journals, which had been carried out in educational contexts and in which the relationship between emotions and teaching-learning processes had been an intentional part of the research objective. Four of the documents are states of the art that were considered relevant, not only because of the information they provided but also to delve into the way the information was classified and organized.

Of the 72 articles, 2 were published in 2014, 5 in 2015, 45 in 2016 and 20 in 2017. Regarding the level of the educational system and population, 3 were carried out at the initial-preschool level, 4 in primary, 20 in basic secondary school, 3 for basic and middle school, 27 at the university level, 2 studies in adult education, 2 with practicing professionals and 4 with practicing teachers. Figure 1 shows the place where the research was carried out.

Figure. 1. Country in which the investigations reported in the study were carried out



Source: Own elaboration

Results

The information found in the documents was organized based on the following categories of analysis (See Table 1).

Table 1. Analysis categories

Category	Subcategory	Elements that compose it
Relationship between emotion and learning	Emotional Value and learning	Positive emotions and learning
		Negative emotions and learning
	Emotional regulation	Emotional regulation
		Coping strategies Emotional awareness
	Aspects that affect the manifestation of emotion in the learning processes	Individual and cultural differences
		Family and peers
		Classroom climate
Incidence of emotion on pedagogical practices	Emotion and didactic knowledge of content	Teaching practices Identification and emotional regulation of the teacher
		Design of learning environments Assessment
		Practices and feedback
		Experience as a teacher
		Aspects that affect the emotion of the the teacher

Source: Own elaboration

Relationship between emotion and academic achievement

Pekrun had already indicated that emotions exert a profound influence on learning: emotions due to achievement activities, in the resolution of cognitive problems, by topics or area of knowledge and by the social relationships that are established in educational environments (Pekrun, 2014). According to the author, positive emotions are experienced as pleasant and can vary in their cognitive and physiological manifestation and influence attention, motivation, the use of learning strategies and the self-regulation of learning. For Schukajlowa and Rakoczyb, emotions are intermediate variables between teaching methods, the prerequisites of motivation, performance and results (Schukajlowa and Rakoczyb, 2016), but as Yavuz, Gülmez, Özkaral mention, even emotions are an invisible dimension in the learning processes (Yavuz, Gülmez, Özkaral, 2016).

The increase in articles that have begun to study the relationship between positive emotion and learning is noteworthy. Texts that delve into joy (Yuan and Lee, 2015, enthusiasm, (Kalén, Lachmann, Varttinen, Möller, Bexelius, Ponzer, 2017; Ansakorpi, Sumelahti and Kaasila, 2017), trust (Yavuz et al., 2016; Ansakorpi et al., 2017), enjoyment (Vierhaus, Lohaus and Wild, 2016;

Villavicencio and Bernardo, 2016; Schukajlowa and Rakoczyb, 2016; Zeivots 2016; Buil, Catalán and Martínez, 2016; Itzek-Greulich and Vollmer, 2017; Scager, Akkerman, Pilot and Wubbels, 2017), pride (Villavicencio and Bernardo, 2016; Buil *et al*. 2016), pleasure (Schneider, Nebel and Rey, 2016) and satisfaction (Buila *et al*., 2016; Urhahne, 2015).

Although it is identified that there are more successful learning processes due to positive emotions (Lin, Su, Chao, Hsieh & Tsai, 2016), some of them, mainly those related to inactivation, such as pleasure or relaxation, can generate the opposite effect.

In subjects such as chemistry, in which the degree of difficulty increases due to the level of abstraction of the content, Sen found that achievement not only depends on cognitive factors, but also on the student's ability to regulate emotions, the value that is assigned to homework and their beliefs about learning (Sen, 2016). Cleary and Kitsantas found that, in learning mathematics, students who discovered more solutions to problems enjoyed lessons more, and that enjoyment could mediate the effects of prior interest in learning (Cleary and Kitsantas, 2017). On the other hand, Schukajlowa and Rakoczyb found that, for solving mathematical problems, students managed to enjoy the lessons more and propose more solutions when they had enough information, increasing interest and performance (Schukajlowa and Rakoczyb, 2016).

In the case of multimedia learning, Knörzer, Brünken and Park (2016) found that positive emotions do not affect the retention of information, but rather in the understanding and transfer, and indicate to be careful since, if not treated with care, can be distracting.

Nash *et al*. as well as Kim and Bennekin identify positive emotions as elements of significant impact on the commitment to finish a study program and persistently maintain the achievement of a goal (Nash *et al*., 2015; Kim and Bennekin, 2016).

Now, despite having found articles that highlight the incidence of positive emotions in learning, many more have focused on the relationship between negative emotions and learning. Some of the identified studies name emotions such as boredom (Vierhaus et al., 2016, Schukajlowa and Rakoczyb, 2016, Buil *et al*., 2016, D'Mello, Dieterle and Duckworth, 2017, Scager *et al*., 2017), exhaustion (Gorgas, Greenberger, Bahner and Way, 2015, McKay, 2016), anguish (Yavuz *et al.*, 2016, Lindqvist, Weurlander, Wernerson and Thornberg, 2017), confusion (McKay, 2016), guilt (McKay, 2016), disappointment (Yavuz *et al.*, 2016), impotence (Lindqvist et al., 2017), insecurity (Yavuz *et al.*, 2016, Ansakorpi et al., 2017), insufficiency (Yavuz *et al*., 2016), inadequacy (Lindqvist *et al.*, 2017), lament (Zeivots, 2016), fear (Yavuz et al., 2016, Ansakorpi *et al*., 2017, Yuan and Lee, 2015, despair (Yavuz *et al*., 2016), frustration (McKay, 2016 and Yuan and Lee, 2015), skepticism (Yavuz *et al*., 2016), irritation (Kalén *et al*., 2017), fury-anger (Yavuz *et al*., 2016), uncertainty (Lindqvist *et al*., 2017, Yuan and Lee, 2015), shame (Yavuz *et al,* 2016) and state anxiety (Hsu, 2016; Villavicencio and Bernardo, 2016; Buckley, Reid, GoosHead, Lipp and Thomson, 2016; Zhou, 2016; Kalén *et al*., 2017; Ansakorpi *et al*., 2017; Su, Kao, Hsu, Pan, Cheng, Huang, 2017), being anxiety the one that has generated the greatest production of knowledge in the last two decades.

Like positive emotions, it is possible to classify negative emotions into physiological and cognitive activation emotions such as anxiety, anger or shame and deactivation as hopelessness and boredom. Even when the documents show a trend that relates negative emotions with negative effects on attention, motivation, thinking, flexibility in the use of learning strategies, information processing and academic performance, studies such as those

of Timostsuk *et al*., and Vierhaus et al. highlight that it is inevitable to experience negative emotions in the classroom, it is part of the process of adapting to knowledge of diverse abstraction and complexity, so that far from avoiding said emotions, a teacher must understand them as part of the process to promote coping strategies and processes of emotional regulation (Timostsuk et al., 2016; Vierhaus *et al*., 2016).

Another group of studies focus on emphasizing *emotional regulation*, which refers to the set of strategies to initiate, increase and order the experience of positive or negative emotions. Most studies focus on activation emotions such as anxiety in children, and few address the issue with adolescents and university students or with deactivation emotions.

Nuske, Vivant and Dissanayake found that *emotional calibration*, an essential element to guide behavior and regulate emotion from others, can negatively affect learning from the social environment and their participation in the cultural and subcultural practices of societies, in this case the schoolgirls, and the coping mechanisms (Nuske, Vivant & Dissanayake, 2016).

Pekrun (2014) indicates that regulation presupposes the recognition of emotions and selection of appropriate ways to handle them, and highlights that emotions can be regulated by directly changing their symptoms (oriented to emotion regulation) or by changing their antecedents (evaluation, competence and regulation oriented to the situation). Tangen highlights that emotional regulation must be adjusted over the years, as the *complexity of emotions*increases, elements such as range, dialectics and degrees of manifestation and combination, both in students and teachers (Tangen, 2017). This author points out that when a teacher can recognize the level of consciousness and complexity of the student, he knows how far to challenge and promote development. Recognition of the complexity is related to what Arguedas *et al* call emotional awareness, an essential element for regulation (Arguedas, 2016). Students with this type of awareness show greater intrinsic motivation, commitment, self-regulation and learning, and in the teacher it can generate a more positive attitude, timely feedback and support in the emotional management of students.

Another element to highlight is that teachers must recognize that emotion changes during the training process, so that as a student feels more or less control of the process, gains more experience or increases the degree of difficulty, adjustments are necessary in the teaching practice. This is corroborated by Costa in learning a second language (Costa, 2016).

In this section, investigations that refer to specific aspects that can influence the manifestation and regulation of emotion in learning processes were found, which teachers must take into account when making their proposals. One aspect is *cultural differences.* Jokikokko and Uitto emphasize that even when it seems obvious that emotions are inevitably present in intercultural learning processes, there is not much research in this regard (Jokikokko and Uitto, 2017). Tangen found that, although basic emotions appear universally in all cultures, the way in which they can be expressed in public varies (Tangen, 2017). Costa indicates it is relevant for working with immigrant students who must be exposed to learning a new language and can affect their learning experience in general due to the experiences of renegotiation of their social identity and way of expressing and regulating their emotion in new educational environments (Costa, 2016).

Another aspect to consider is the *individual differences*. Lindqvist et al. emphasize that even students who have been socialized in the same culture have different tendencies in the manifestation of emotions and types of coping (Lindqvist *et al*, 2017). These differences are

conditioned by the student's level of experience with the educational context, an area or subject, as well as the approach to practical and abstract knowledge and exposure to a particular teaching style. Pekrun highlights other individual factors that intervene such as confidence, determination, effectiveness and motivation (Pekrun, 2014).

With respect to gender, Buckley et al. found that, although a male advantage in science learning has been reported, they cite researchers (Ben-Zeev, Duncan, & Forbes, 2005; Geary, 1999), who have questioned the results (Buckley et al., 2016). They indicate that there could be greater determination by aspects such as the socialization of the students and the competency beliefs that are installed on them. Now, Sánchez mentions that even though there is accumulated evidence that supports that women may present greater anxiety before exams, few studies have explored gender differences in other emotions and in other achievement situations (Sánchez, 2013).

Pekrun 14) highlights that the learning process not only affects the classroom itself as an environment and teacher, but there are related actors such as *parents, family members and classmates*. Against this, Buckley et al. (2016) found that parents, especially mothers, affect anxiety, negative attitudes and beliefs about mathematics. On the other hand, Yavuz et al. (2016) point out the relationship between the future expectations of students and their parents and the emotions that around these expectations are generated in the learning processes of related subjects.

Peers are also important in regulatory processes. Ruzek, Hafen, Allen, Gregory, Mikami, and Pianta found that interpersonal relationships can mitigate stress and are instigators of positive motivational states (Ruzek, Hafen, Allen, Gregory, Mikami, & Pianta, 2016). This occurs especially in adolescence by influencing beliefs about their academic competence and behavioral and emotional commitment. Quite the opposite happens with students who do not feel part of the group, and even when this does not necessarily affect their performance, it can affect low emotional commitment at school.

Morcom highlights that schools are recognized as places of academic learning, but also a context for social and emotional development (Morcom, 2014). Bullying is a widespread problem in schools and the negative repercussions can last into adulthood. Limited social and emotional development affects a child's ability to collaborate and learn effectively with peers (Morcom, 2014, citing Boyd, Barnett, Bodrova, Leong, and Gomby. 2005, and Ladd et al., 1997).

Finally, another aspect identified in the research was the incidence of *educational and curricular reforms* on the emotions of the students. Zhang, for example, found the impact of reforms on the poor performance of a secondary school, given the academic pressure (Zhang, 2016). Curricular adjustments focused on promoting well-being, promoting resilience, positive emotion, and engagement generated significant improvements three years later.

Incidence of emotion in teaching practices

A significant part of the investigated articles highlighted the incidence of emotion in teaching as a significant element in the pedagogical content knowledge (PCK) and others, above all, in the emotion of the educational agent. As indicated by Lindqvist et al., for an adequate development of their teaching practices, teachers must be able to recognize and address the emotional state of students and take actions that affect their learning (Lindqvist *et al*., 2017).

The PCK refers to all the elements, conditions, strategies and didactics carried out by the teacher, including feedback and evaluation to promote optimal learning in students (Mellado *et al*., 2014). This knowledge, Mellado emphasizes, is a form of reasoning and didactic action, in which teachers transform content into representations that allow the understanding of their students. However, even when it is known that emotion must be a founding element, such as the cognitive domain, it is one of the great absentees in research and practice (Mellado *et al*., 2014 and Melo and Cañada, 2018).

Well-structured and clear instruction and the use of challenging tasks promote understanding by students, who experience increased self-confidence and enjoyment, and a reduction in boredom and anxiety (Pekrun, 2014).

With respect to the *academic challenges*, Vierhaus et al. highlight how these affect emotional regulation and coping strategies not only in the classroom, but in life in general (Vierhaus *et al*., 2016). However, Scager *et al*. point out that teachers should challenge students without ignoring the complexity of individual differences, as some challenges can increase stress, promote negative emotions, and affect their relationship with students (Scager *et al*., 2017). A dilemma for teachers is how to challenge everyone without excluding some students given their different abilities, being careful not to fall into pedagogical condescension. This can be related to the intentional work that must be done from an early age with children, since as Jarvela, Jarvenoja, Malmberg, Isohatala and Sobocinski indicate, decades of research have shown that if students develop a strong sense of their own competence, they approach academic challenges as challenges to master rather than threats to avoid (Jarvela, Jarvenoja, Malmberg, Isohatala and Sobocinski, 2016).

Another aspect to consider is the *identification and emotional regulation* that teachers make and promote in students and especially with themselves.

Regarding the recognition of the student's emotion, studies were found (Peña, Rangel, Muñoz, Mejía and Lara, 2016; Bahrain, Nadolski and Westera, 2016; Liew, Zin, Sahari and Tan, 2016; Imbernón, Manjarrés, De La Paz, 2016; Buil et al., 2016; and Huang, Chen and Chou, 2016) in which the challenges of teachers in the processes of *e-learning*are explicit, and automatic computer systems, since they do not easily have the signals, expressions, interactions and non-verbal behavior as in a regular classroom that allow them to make decisions and make timely adjustments that impact on learning. Studies point to different technological tools and supports that can be considered to respond to this new need. What is striking from previous studies is that all those who use technology start from the need to incorporate knowledge and management of the emotions of those with whom it is intended to generate learning. This is what Mellado et al. and Melo et al. referred to with the need to make this domain within the PCK aware in regular classrooms (Mellado *et al*, 2014; Melo, *et al*., 2018).

Nash et al. indicate that in the face of the *identification of emotion* while teachers tend to believe that participation in learning is predominantly cognitive, for students it is affective, hence they mark the need not to overlook the emotions associated with the learning experience (Solomonides and Martin, 2008 in Nash *et al*., 2015).

Now, with regard to the recognition and regulation of emotions of the teachers, Arguedas, Daradoumis and Xhafa indicate that a teacher with developed levels of emotional awareness can generate a more positive attitude, effective feedback, support in the emotional management of students (Arguedas, Daradoumis and Xhafa, 2016).

In the learning processes, a study with experiential education for adults in Australia indicates that the learning experiences with adults are different and that the emotions reported by them seem to indicate being higher and different from childhood (Zeivots, 2016). While children tend to show more enjoyment for learning, adults do not live it in the same way, this may be due to the high level of adult responsibility, so they cannot devote as much time or energy to learning. The authors even point out that adults feel more fearful as they perceive their limited abilities and do not respond as quickly or effectively as before. A teacher should be vigilant about incorporating this type of understanding into their PCK.

Timostsuk *et al.* (2016) cite Janssen *et al*. (2008) who found that teachers who have the habit of reflecting on their teaching experiences have a more positive attitude towards their work, are able to make more innovative decisions and are more motivated to implement them (Timostsuk *et al*., 2016 citing Janssen *et al*., 2008). Itzek-Greulich and Vollmer find that while students' motivation for science declines in high school, exposing a group of students to relevant and novel teaching strategies can decrease negative emotions and increase interest in the classroom (Itzek-Greulich and Vollmer, 2017).

A reflective teacher, as Palmer indicates, should know that there is a greater willingness to learn at the beginning of a session, which is the time when there is greater influence by immediate and anticipated emotions, perceptions of control and value. Thus, this knowledge allows the teacher to make decisions regarding the way they present a topic, the level of difficulty and theorization (Palmer, 2017). Jokikokkoa *et al.* indicate that teachers should improve their ability to respond to the needs of various students, this implies continuous reflection and expanding opportunities for them to learn in practice in various contexts. However, little theorization is evidenced about this (Jokikokkoa *et al*., 2017).

An aspect frequently pointed out in the articles has to do with *evaluation and feedback*. Pekrun (2014) mentions that the organization of tests and evaluations, and the feedback provided by the teacher have a direct impact on the emotions of the students. Some studies such as urhahne's are highlighted, who found that when students consider that the teacher underestimates them, they tend to have low motivation and negative emotions, and vice versa. The author emphasizes that the teacher's judgment on student achievements is very important since they convey a message about their abilities, hence the importance that teachers develop their ability to make accurate judgments about student performance and support strategies that guide their best performance (Urhahne, 2015). Regarding public assessments, Nash et al. indicate that the strategies used by teachers can lower anxiety levels and minimize the negative impact on homework, so that students complete it successfully (Nash *et al*., 2015).

Now, regarding feedback, Hu and Choo point out teacher feedback can direct and facilitate learning if their content focuses on tasks, processes, and actions. According to the authors, feedback is most effective when it is dialogical, personalized, balanced in positivity and negativity, giving clarity on the aspects that must be modified, detailed and specific and devoid of inflated language. Comments are more likely to be addressed if they come from a teacher who generates credibility, empathy and receptive to the affective needs of students (Hu and Choo, 2016); Brinko, (Brinko, 1993, cited by Hu and Choo, 2016), mentions that studies have been done on how teacher feedback impacts learning, but studies focused on the language used to evaluate and feedback are lacking.

Tennant, Demaray, Malecki, Terry, and Clary note that while there is a large literature base explaining the benefits of positive student-teacher relationships, very few studies have examined the specific role of different types of teacher social support in the student (Tennant, Demaray, Malecki, Terry, & Clary, 2015). Arguedas et al. add that adequate affective *feedback* can encourage students to resume or redirect tasks that generate negative emotional states (Arguedas et al., 2016).

All of the above highlights the need to delve into the emotional competencies that teachers must have to provide the most appropriate affective feedback for their students, however, knowing that it should be done this way does not mean that you have the tools to do it in conformity.

An aspect on which we would like to dwell, and which in our opinion is novel within the category of emotion and teaching practice, is the one that focuses on the *emotion of the teacher.* Thus, for example, we highlight the state of the art made by Fried et al. in which a model is proposed on the way in which the emotion of the teacher has been conceptualized in literature and its impact on classroom life (Fried et al., 2015). The authors point to a variety of studies. For example, on the relationship between the emotions of the teacher in different aspects of classroom life, the identity of the teacher, the correlation between the emotion of the teacher and the student, the ability of teachers to manage uncertainty and change, the intelligence and emotional competencies of teachers.

Rui and Icy indicate that in research on teacher identity little attention has been paid to how teachers in training construct their identities with the negotiation of different emotions in their practice (Rui and Icy, 2016). Coinciding with the above, Jokikokko et al. are interested in showing how novice teachers learn to handle micro-political situations, finding that over time experienced teachers learn to negotiate emotionally intense situations, learn to live with emotional dissonance and have more effective strategies to achieve it (Jokikokko et al., 2017); and Peña *et al*. how expert teachers know how to use their emotion to recognize and address the emotional state of students and take actions that affect their learning (Peña *et al*., 2016).

On this topic we find other authors such as Buckley et al. who address the issue of anxiety on the part of teachers and its impact on teaching practices (Buckley et al,2016); McKay points out the need to expand information on the emotions experienced by teachers who teach children with diverse conditions (McKay, 2015); Timostsuk et al., Lofgren and Karlsson, and Korthagen who find that there is danger from permanent negative emotions, burnout, and abandonment by teachers working in challenging classroom situations without sufficient support (Timostsuk et al., 2016; Lofgren and Karlsson, 2016; Korthagen, 2017); and Jokikokko et al. (2015) and Clement and Vandenberghe (2000, cited by Zhou, 2016) who have pointed out that feelings of mutual trust and warm personal relationships between teachers at school are essential for the development of their teaching practices (Jokikokko et al., 2015; Clement and Vandenberghe, 2000, cited by Zhou, 2016).

Conclusions

Throughout the text, some of the results considered relevant of the 72 investigations carried out mainly between 2016 and 2017 were presented. As indicated in the introduction, these results have given a relevant place to emotion within the teaching and learning processes. Although each of these results has particular conditions of interpretation based on the epistemological and methodological positions with which they were carried out, those aspects that in the opinion of the authors can give indications of the topics that have already managed to consolidate as important for education,

pedagogy and didactics, such as the emotion of the student and its relationship with academic achievements, and others that have been gaining a place, although with little supporting evidence, such as the emotion of the teacher and the incidence of emotion in the Pedagogical Content Knowledge were indicated. With regard to this last point, it is important to carry out studies that show us the role of the emotional state of the teacher, his way of handling it in the classroom and the impact it has on students and their learning.

On the other hand, we identify that there are a lot of definitions and aspects that have been discussed about emotions. As it is already known, emotions are considered multicomponent, and comprise elements such as evaluation, physiological change, subjective experience, emotional expressions, and action tendencies. Such complexity is not usually taken into account in the literature on emotions, and perspectives from neuroscience, basic psychology and neuropsychology are often ignored. We believe that, if we are going to study emotions, we must start from scientifically, well-supported constructs. The social aspect of emotions generates differential positions on issues that are not necessarily different.

In short, we believe that this work represents a fundamental tool for educators and neuroscientists so that they can build methodologies aimed at establishing the link that exists between these two topics.

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