Interwoven Emotions in the Development of Creative Processes: EcoeducaSustainable, an Educational Innovation Project

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Abstract

The research examines the role of emotions in creativity within educational environments, emphasizing the influence of sustainability education on adolescent students. Utilizing the Positive and Negative Affect Schedule (PANAS), the study explores how emotions impact students' well-being and academic achievements, advocating for early emotional assessments. Central to the research is the EcoeducaSustainable project, which integrates sustainability education to study its effect on emotional responses and creativity. The project employs Spearman's Rho to reveal complex emotional dynamics, offering insights on how to enhance educational strategies through emotional engagement. The findings highlight the importance of addressing emotions in education, particularly for fostering environments conducive to creativity and sustainable learning. This work significantly contributes to the fields of emotional intelligence, creativity, and sustainability in education.

Keywords: Emotional Intelligence, Creativity, Sustainability Education, Adolescent Learning, Emotional Assessment

Introduction

The study of emotions in educational contexts and their influence on creative processes has garnered significant interest in recent decades (Rosser & Soler, 2023a, 2023b). Adolescence, a period characterized by extremes in emotional expressions (Casey et al., 2010), presents a particularly rich scenario for exploring how these emotions intertwine with creativity and learning. Understanding affectivity, through tools such as the original version of the Positive and Negative Affect Schedule (PANAS) (Watson et al. 1988;

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Watson et al. 1988), provides a quantitative basis for evaluating these emotional states. Research on the Positive and Negative Affect Schedule (PANAS) suggests that the factors of positive and negative affect are neither independent nor orthogonal, but rather, they are correlated. This finding is crucial for establishing a theoretical framework that acknowledges the complexity and interconnectedness of emotions during the creative process. Such an understanding reinforces the premise that emotional experiences in educational and creative contexts are intrinsically intertwined, challenging the traditional view that positive and negative emotions operate in isolation (Allan, Lonigan, & Phillips, 2015). Furthermore, advancements in the localization and cultural adaptation of emotional measurement tools are exemplified by the work of Ortuño-Sierra, Bañuelos, Pérez de Albéniz, Lucas, & Fonseca-Pedrero (2019), who have adapted the PANAS for Spanish-speaking populations, particularly children and adolescents. This adaptation is vital for accurately capturing the emotional nuances specific to different cultural contexts, thus enhancing the applicability and effectiveness of the PANAS in diverse educational settings (Ortuño-Sierra et al., 2019)

Further enriching this perspective, recent research by Koyuncu (2023) underscores the effectiveness of neuroscience-based mindfulness in enhancing emotional regulation among adolescents. The study highlights significant improvements in the non-judgmental subscale of the Adolescent Mindfulness Scale, indicating a robust enhancement in emotional awareness and management among participants. These findings suggest that integrating mindfulness practices into educational settings could foster an environment conducive to emotional stability and improved cognitive performance.

Adding another layer of innovation, a recent study by Perdana, Puspasari, Iqbal, & Hidayat (2024) explores the use of virtual reality (VR) as a tool to enhance the learning environment by directly engaging students' emotional and attentional states. This study underscores the potential of VR technology to transform traditional learning methods by creating immersive, interactive

experiences that can significantly impact emotional engagement and cognitive performance in educational settings (Perdana, et al., 2024). The effectiveness of VR in modulating attention and emotion could serve as a valuable addition to the methodologies used to foster a deeper emotional connection with educational content, thereby enhancing creativity and learning outcomes

The PANAS stands out for its ability to distinguish between positive affect (PA), which includes emotional states such as happiness or excitement, and negative affect (NA), which encompasses unpleasant emotional experiences such as anger or frustration (Watson et al., 1988). The relevance of investigating these emotional dimensions lies in their direct impact on student well-being and academic and creative performance. Recent studies have sought to adapt and refine the PANAS to make it more applicable to children and adolescents, recognizing the need to address these emotional measures in early stages of development (Ebesutani et al., 2012; Kercher, 1992; Laurent et al., 1999; Thompson, 2007). Reciprocal associations between positive emotions and resilience as predictors of flourishing among adolescents have been examined, supporting the hypothesis of upward spirals of well-being (Gilchrist et al., 2023). Similarly, adolescents who had higher-than-usual levels of resilience reported more positive emotions the following year (Gilchrist et al., 2023). In the same vein, studies on age-related differences and specific emotion patterns in emotion regulation during adolescence have been addressed (Theurel & Gentaz, 2018).

Within the framework of the EcoeducaSostenible project, an educational innovation project focused on sustainability aims to explore how sustainability education can influence students' emotions and, in turn, how these emotions affect the creative process.

Emotions are recognized as a catalyst in the student learning process; however, students' emotional engagement can pose a challenge from a pedagogical standpoint, especially when the content addressed has a

negatively disruptive emotional impact (Österlind, 2012). Higher education students face a world that needs assistance in creating sustainable solutions for complex systems. In this regard, emotional learning and emotional design are important, and how they can connect to enhance Education for Sustainable Development (ESD) (Garcia et al., 2022). From another perspective focused on the necessary preparation of teachers in this field, a scale has been developed to assess the self-efficacy of primary school teachers in Education for Sustainable Development (ESD), including four domains of competencies: values and ethics, systemic thinking, emotions and feelings, and actions. (Malandrakis et al., 2019).

The integration of the Sustainable Development Goals (SDGs) in the early stages of our project seeks, therefore, not only to promote meaningful learning about sustainability but also to stimulate creative expression through deep emotional understanding, seeking to unravel the complex network of emotions present during the creative process in adolescents, and emphasizing how sustainability education can serve as a catalyst for such emotions.Through a detailed analysis of the phases of the EcoeducaSostenible project, from initial understanding and planning to exposure and evaluation of results, we aim to provide a comprehensive view of the emotional dynamics underlying learning and creativity in sustainable educational contexts.

Existing literature provides a solid theoretical foundation on the role of emotions in learning and creativity; however, the specific application of these concepts in the context of sustainability education and their impact on the creative process represents an emerging field of study. By employing statistical tools such as Spearman's Rho (Menacho-Vargas et al., 2021; Rojo-Ramos et al., 2022), this study aspires to contribute to the existing body of knowledge, offering new insights into the interaction between emotions, creativity, and sustainability in education.

Method

This study, structured to assess the impact of a teaching activity, focuses on two main axes: the emotions of the students and their pedagogical interest towards active methodologies. A quasi-experimental repeated measures design was adopted, allowing for the analysis of the students' emotions and perceptions after carrying out the activity, following previously established methodologies.

The sample consisted of 86 third-year secondary education students, enrolled in Geography and History subjects. The selection of participants was comprehensive, including all those enrolled in these subjects

For the evaluation of emotions, a Google form was used, complemented by the Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Carey, 1988), before and after the activity. Quantitative analyses were conducted using SPSS Statistics, version 29.0.1.0.

The study was conducted in several phases, starting with the selection and assignment of student groups to the activity, focused on the EcoeducaSostenible project.

The project unfolded through a meticulously structured process, commencing with an introductory phase where participants were acquainted with the significance of sustainability and its linkage to the Sustainable Development Goals (SDGs). This initial phase employed a learning stations methodology, as delineated by Dangwal, Sharma, & Hazarika (2014), enabling students to assimilate the foundational knowledge requisite for conceptualizing their projects. The multifaceted advantages of learning stations were highlighted, emphasizing their role in nurturing responsibility, enhancing research skills, kindling curiosity, supporting personalized learning, and fostering autonomy, thereby allowing students to navigate their educational journey at their own pace and according to their preferences (Soler & Rosser, 2023).

Progressing to the second phase, the focus shifted towards the conceptualization of the creative process aimed at curating an exhibition centered on sustainability. This phase was initiated by selecting a pertinent topic from a range of pre-discussed themes such as natural resources, affordable energy, responsible production and consumption, climate action, life on land ecosystems, and sustainable cities and communities. Following the topic selection, explicit objectives for the exhibition were established to encompass knowledge sharing, promotion of specific actions, and educational goals. Subsequent steps involved comprehensive research on the chosen topic, the development of educational content including infographics, short videos, posters, and presentations, and the design of exhibition materials utilizing tools like Canva and Adobe Spark. This phase was critical for ensuring the relevance and quality of the material, crafting concise and impactful messages, and strategizing the exhibition's presentation to maximize its impact through the selection of appropriate platforms and the creation of promotional materials.

The culmination of these efforts was a collaborative endeavor to address pivotal sustainability issues, spanning from the initial understanding and topic selection to research, content development, and the strategic planning of the exhibition's presentation. This project not only fostered creativity and critical thinking but also heightened awareness and encouraged sustainable actions within the educational community.

The final phase, exhibition and evaluation, marked the transition from the preparatory stages to the actual presentation, with an emotions survey administered to gauge students' sentiments as they moved from phases one and two to phase three. This comprehensive approach underscored the project's commitment to not only educating about sustainability but also to understanding the emotional dynamics involved in such a learning process.

The data were statistically analyzed to assess differences in students' perception and motivation based on demographic variables, as well as their

emotions. Patterns and trends in the results were identified, providing a profound understanding of the relationship between the pedagogical use of active methodologies and students' emotional responses.

The study adhered to the ethical principles of scientific research, obtaining informed consent from participants and ensuring the confidentiality of data.

It is acknowledged that the study has limitations, including the size and representativeness of the sample. These limitations are important to consider when generalizing the results, but they are supplemented and complemented by those published here, as well as in other works on the topic (Rosser & Soler, 2023b; Soler & Rosser, 2024).

With the primary aim of unraveling the intricate network of emotions present during the creative process, the research set out to achieve the following specific objectives:

- To understand the influence of sustainability education on students' emotions: Analyze how the introduction to sustainability concepts and the Sustainable Development Goals (SDGs) affect the emotions of participants in the initial stages of the creative process.

- To analyze emotional dynamics during research and content development: Utilize Spearman's Rho to explore how emotions evolve during the phase of research and development of educational content on sustainability.

- To unravel the emotions involved in the design and creation of exhibition material: Evaluate the emotions experienced when using design tools to create exhibition and promotional materials, and how these emotions affect creativity and the final message.

- To use Spearman's Rho analysis to quantify correlations between emotions during the creative process: Delve into statistical analysis to identify patterns and significant correlations between different emotions throughout the project phases, providing a detailed understanding of the emotional network at play.

Results & Discussions

A preliminary qualitative analysis of a descriptive nature was conducted to verify the means of emotion variables in students prior to Phase 3 of the educational project (Figure 1).
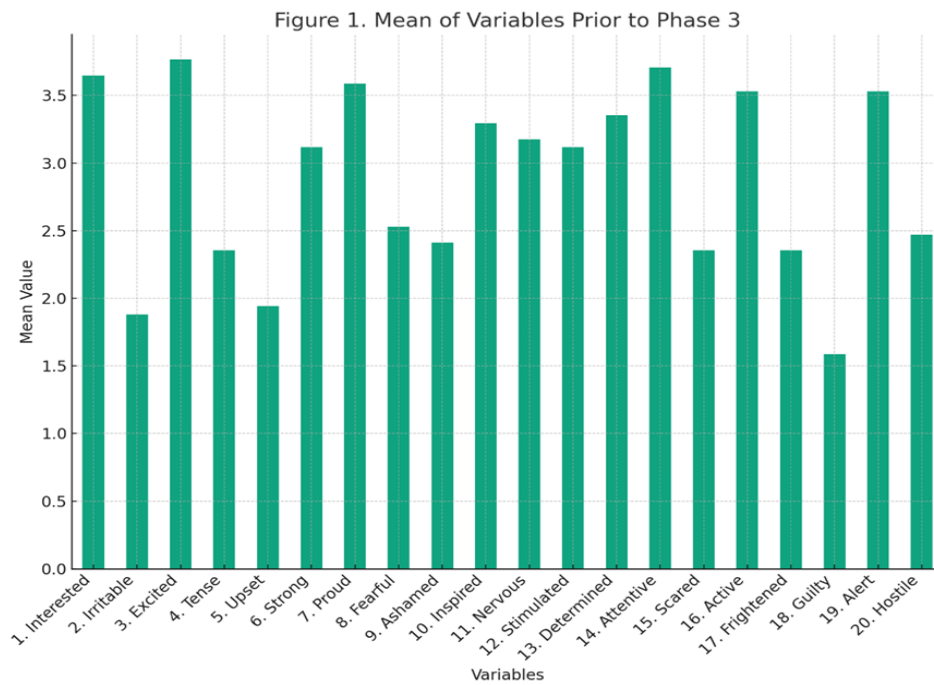

Figure 1 . Mean of variables prior to Phase 3

The figure was created based on data collected from our own research.

In our Results Analysis Using Spearman's Rho, we delve into the emotions experienced during the development of our project, employing Spearman's Rho as a pivotal statistical tool (Rojo-Ramos et al., 2022). Our main aim is to uncover potential nonlinear and nonparametric relationships among various emotional states across different project stages. Spearman's Rho is particularly apt for this analysis because of its proficiency in evaluating monotonic correlations within datasets that may not conform to normality assumptions (Arif, Islam, Chowdhury, & Kabir, 2023).

Indeed, Spearman's Rho is a nonparametric correlation coefficient that measures the strength and direction of the relationship between two variables.

Unlike Pearson's correlation coefficient, Spearman's Rho does not require variables to have a normal distribution and is particularly useful when the relationship between variables is monotonic but not necessarily linear (Arora, 2023; Menacho-Vargas et al., 2021).

The Heat Map in Table 1 displays the correlation data between different variables representing emotional states or attitudes such as "Interested," "Irritable," "Excited," etc. The numbers in the matrix are correlation coefficients between pairs of variables. These coefficients can range from -1 to 1, where 1 indicates a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 indicates no correlation.
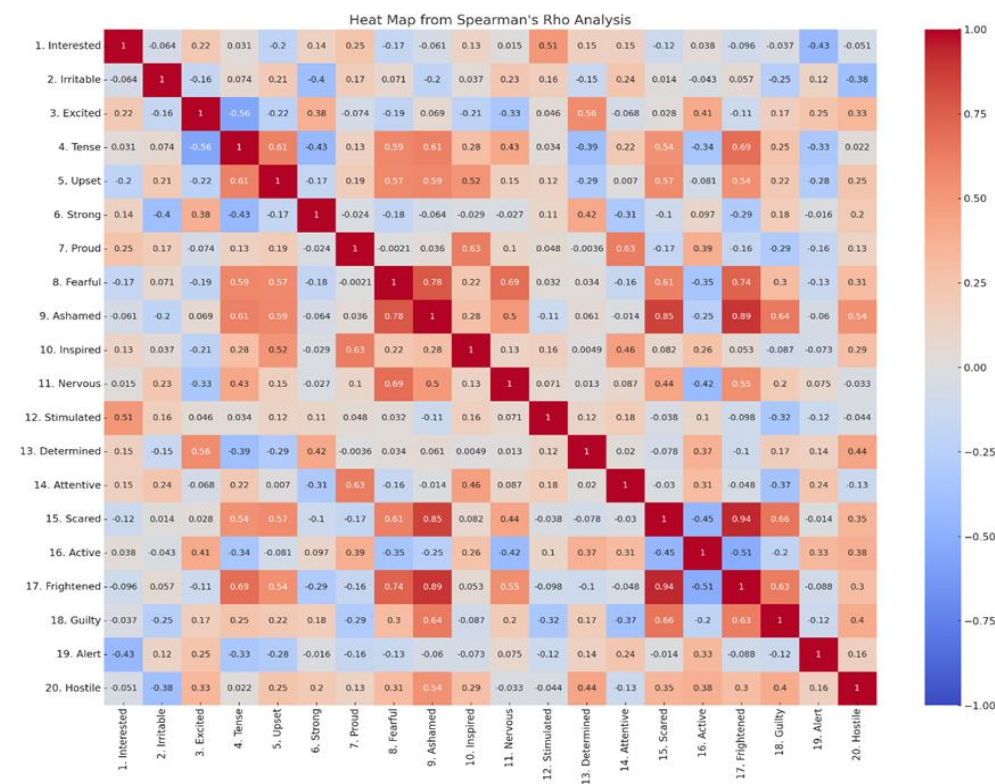

Figure 2 . Heat Map from Spearman's Rho analysis with weak, moderate, and strong correlations

The figure was created based on data collected from our own research.

The graph allows us to see the existence of different correlations, such as: "Weak correlation: 0 to 0.3 (positive or negative)", "Moderate correlation: 0.3

to 0.5 (positive or negative)", and "Strong correlation: 0.5 to 1 (positive or negative)".

Based on the results of the analysis reflected graphically in the previous heat map, we will interpret how emotions behave with each other.

Relationship between Tense and other emotions:

1. Excited:

There is a significant negative correlation between tense and excited where the Spearman correlation coefficient (ρ) is -0.56 with an associated p-value of 0.019. In the context of the creative process, this implies that when individuals experience tension, they are less likely to also experience excitement during creation, and vice versa (Figure 2).

2. Disgusted, fearful, ashamed, fearful, and scared:

On the other hand, there are significant positive correlations between feeling tense and feeling disgusted, fearful, ashamed, fearful, and scared, with the following Spearman correlation coefficients (ρ) in consecutive order: 0.61, 0.59, 0.61, 0.54, and 0.69, with associated p-values of p=0.009, p=0.014, p=0.009, p=0.027, and p=0.002 respectively, indicating that tension is associated with negative emotions mostly. Therefore, it is understood that when one variable (feeling tense) increases, the other variable (feeling disgusted, fearful) tends to increase as well, and vice versa. Therefore, the presence of tension in the creative process tends to go hand in hand with the presence of negative emotions such as disgust and fear, not to mention shame (Figure 3).
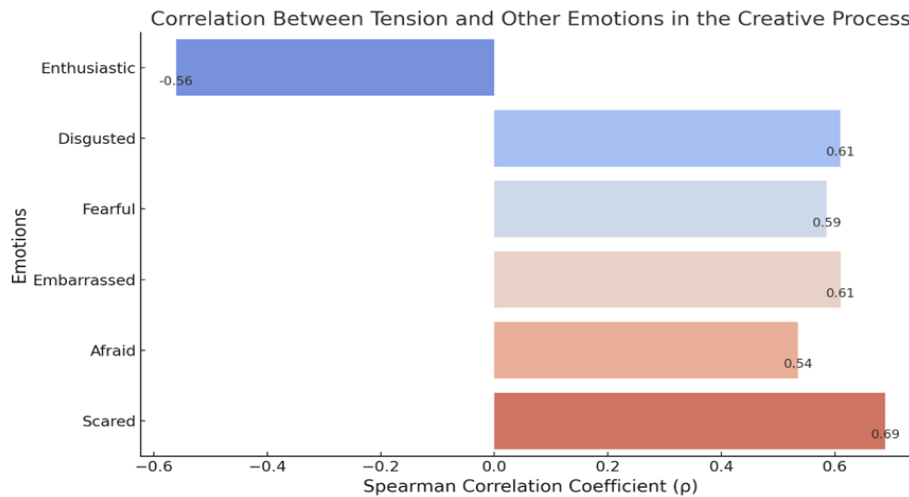
Figure 3 . Bar graph on the correlation between Tension and other emotions in the Creative Process

The figure was created based on data collected from our own research.

Relationship between Embarrassed and Other Emotions:

Fearful, Tense, and Disgusted:

There are significant positive correlations between Embarrassed and the emotions fearful, tense, and disgusted, with the Spearman correlation coefficient (ρ) of 0.78, 0.61, and 0.59 respectively, and associated p-values of 0.009; 0.0014; and 0.000. This suggests that, in the context of a creative project, when students feel fearful, they are likely to also experience elevated levels of tension and disgust (Figure 4).

Relationship between Inspired and Other Emotions:

Disgusted, Proud:

There is a relationship between "Inspired" and "Disgusted," where the Spearman correlation coefficient (ρ) is 0.52. This positive value indicates a moderate positive correlation between the two variables, with an associated p-value of 0.031. This could suggest that, in the creative process of students, the feeling of inspiration is associated with some degree of disgust. There

might be a connection between seeking creativity and experimentation, which in turn could generate feelings of disgust (Figure 5).
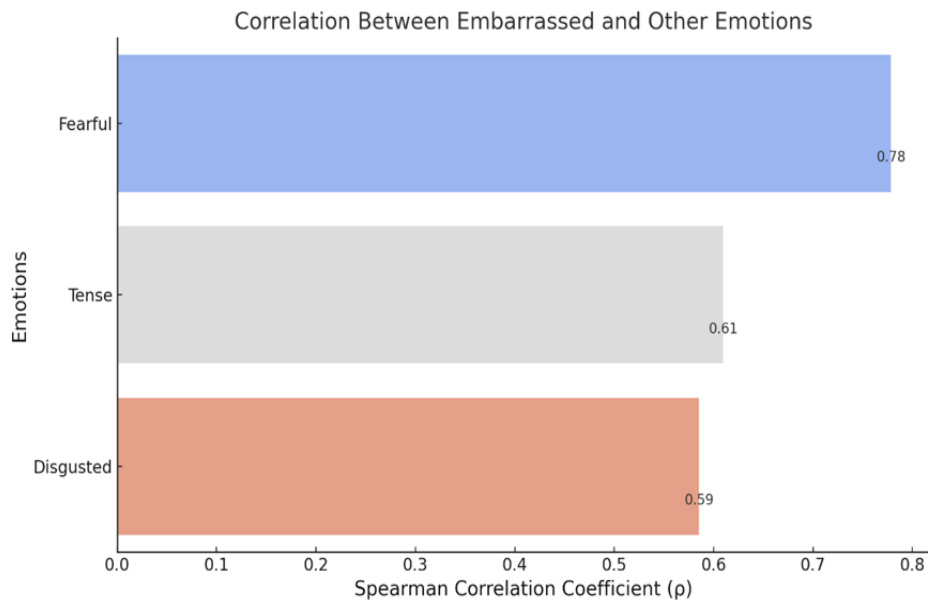

Figure 4 . Bar graph on the correlation between Tension and other emotions in the Creative Process
The figure was created based on data collected from our own research.

For the relationship between "Proud" and "Inspired," the Spearman correlation coefficient (ρ) is 0.63. This positive value indicates a strong positive correlation between the two variables, with a p-value associated with the correlation of 0.007 (Figure 5). In the context of students' creative process, this suggests that when students feel inspired, they also experience a strong sense of pride. Inspiration may be linked to the generation of creative ideas and innovative solutions, leading to a sense of achievement and pride.
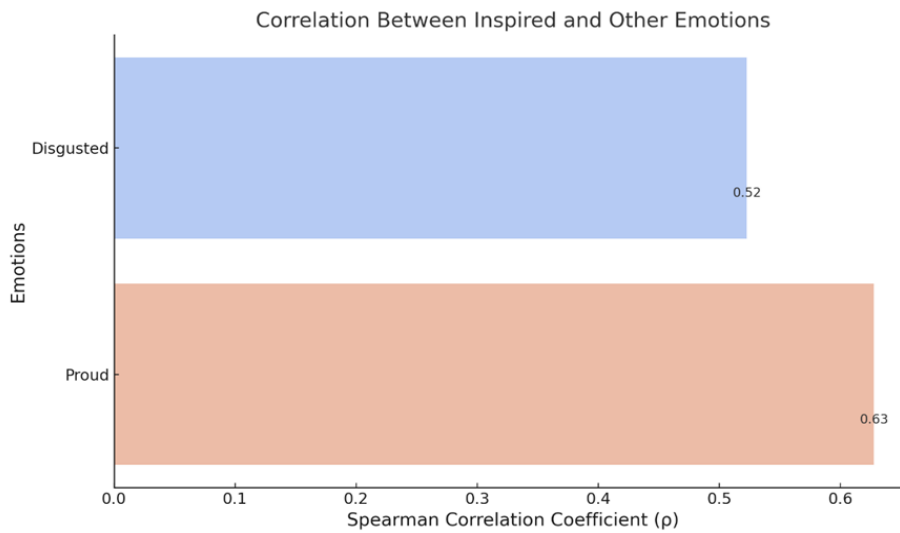
Figure 5 . Bar graph on the correlation between Inspired and other emotions in the Creative Process
The figure was created based on data collected from our own research.

Relationship between Nervous and Other Emotions:

Fearful, Embarrassed:

The relationship between Nervous and the other emotions reveals a Spearman correlation coefficient (ρ) with respect to Fearful of 0.69. This positive value indicates a strong correlation between the two variables, with an associated p-value of 0.002.

While with respect to Embarrassed, the Spearman correlation coefficient (ρ) is 0.50, indicating a moderate correlation with an associated p-value of 0.041. (Figure 6).

Regarding the correlation between "nervous" and "fearful," the strong positive correlation indicates that, during the creative process, feeling nervous is significantly associated with experiencing fear. This connection suggests that anxiety or nervousness may manifest as fear during creative activity, possibly related to uncertainty or self-evaluation. On the other hand, the correlation between "nervous" and "embarrassed" is also positive but lower, suggesting that the sensation of nervousness is significantly associated with

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feeling embarrassed during the creative process. This could indicate that self-awareness and concern for self or others' evaluation may contribute to the experience of nervousness in the creative context (Figure 6).
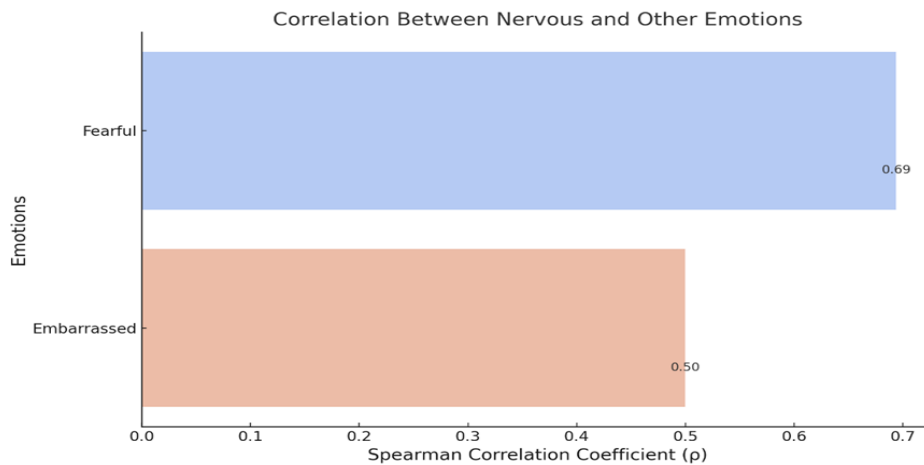

Figure 6 . Bar graph on the correlation between Nervous and other emotions in the Creative Process
The figure was created based on data collected from our own research.

Relationship between Stimulated and Other Emotions:

Interested:

A Spearman correlation coefficient (ρ) of 0.51 is observed between Stimulated and Interested. This positive value indicates a moderate correlation between the two variables, with an associated p-value of 0.038. This means that there is a joint increasing trend between the two variables: when students feel stimulated during the creative process, they also tend to show greater interest in the creative activity (Figure 7).

Interpretation can benefit from considering the context of the creative process. For example, feeling stimulated may contribute to increased interest and engagement in creative tasks.
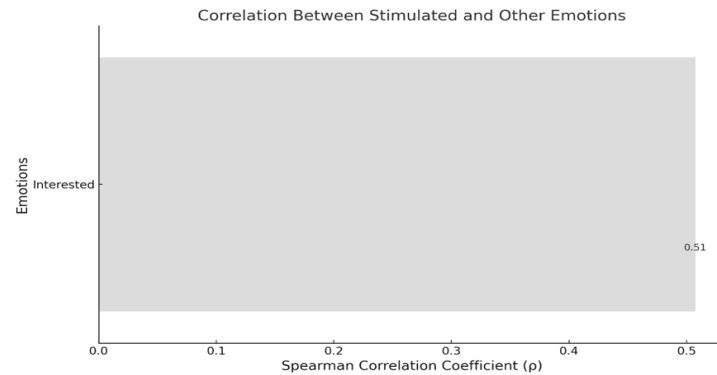
Figure 7 . Bar graph on the correlation between Stimulated and other emotions in the Creative Process

The figure was created based on data collected from our own research.

Relationship between Determined and Other Emotions:

Excited:

Determined and Excited. The data indicate that there is a positive relationship between feeling Determined and being Excited during the creative process. Where the Spearman correlation coefficient (ρ) is 0.56 associated with corresponding p-values of 0.019. In practical terms, these results suggest that when students feel determined during the creative process, they also tend to experience a higher level of excitement in the creative activity (Figure 8).
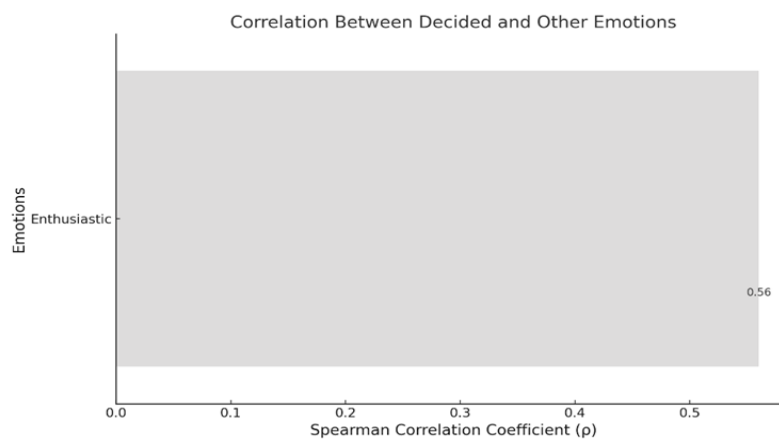

Figure 8 . Bar graph on the correlation between Determined and Emotions in the Creative Process

The figure was created based on data collected from our own research.

Relationship between Attentive and Other Emotions:

Attentive and Proud.

A Spearman correlation coefficient (ρ) of 0.63 is observed. This positive value indicates a strong positive correlation between the two variables. With an associated p-value of 0.007, which is lower than the commonly used significance level of 0.05. In practical terms, these results suggest a significant and strong association, indicating that when individuals are more attentive during the creative process, they tend to experience higher levels of pride (Figure 9).
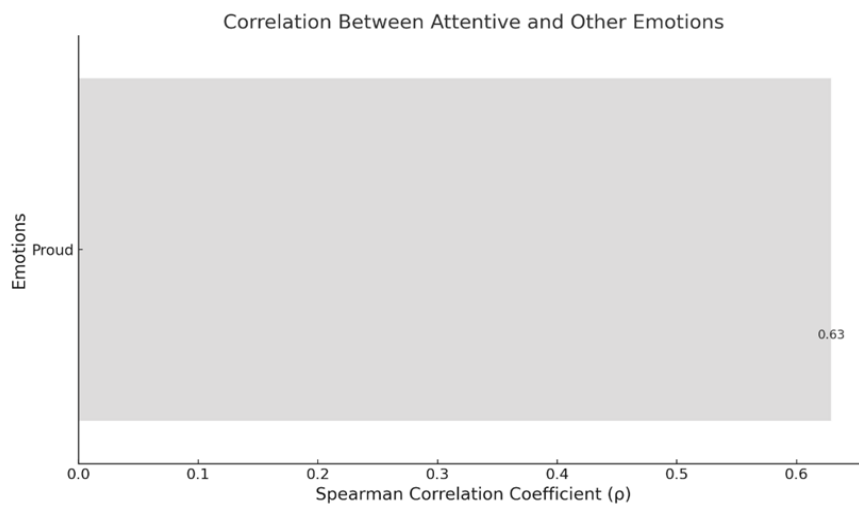

Figure 9 . Bar graph depicting the correlation between Attentive and Proud in the Creative Processs

The figure was created based on data collected from our own research.

Relationship between Fearful and Other Emotions:

1. Tense.

There is a moderate positive correlation (ρ = .54) between feeling fearful and tense. A p-value of 0.027 indicates that this correlation is statistically significant but less strong than others in the table.

2. Disgusted.

The correlation between feeling fearful and disgusted is also moderate (ρ = .57), and it is statistically significant with a p-value of 0.018.

3. Fearful.

There is a stronger positive correlation (ρ = .61) between feeling fearful and fearful, with high statistical significance (p = 0.009).

4. Embarrassed.

The correlation between feeling fearful and embarrassed is very strong (ρ = .85), implying that the tendency to feel fearful is highly related to the sensation of embarrassment. This correlation is extremely significant with a p-value of 0.000.

5. Partial Conclusions.

In all cases, the p-values associated with the correlations are lower than the commonly used significance level of 0.05 (Figure 9). This suggests that the correlations are statistically significant, meaning that the observed relationships are unlikely to be due to chance. In practical terms, these results suggest significant and practical associations among the mentioned emotions during the creative process. For example, the fact that emotions of fear are positively correlated with other emotions such as tension, disgust, fear, and embarrassment indicates specific emotional patterns in the creative context. The correlations range from moderate to very strong (Figure 10).
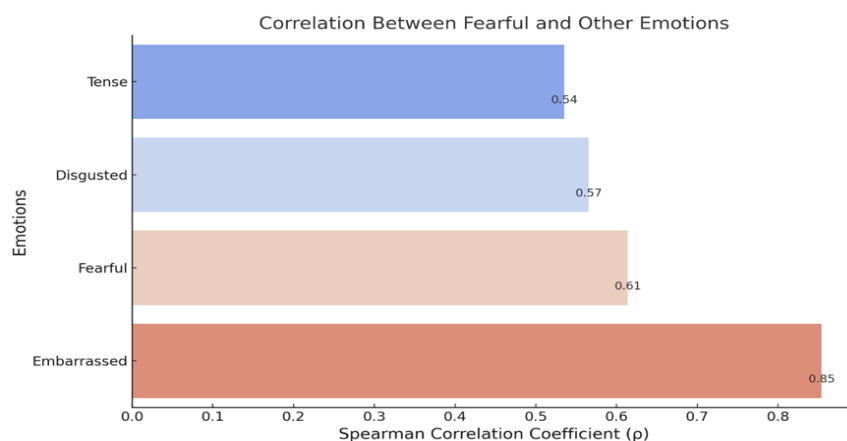

Figure 10 . Bar graph depicting the correlation between Fearful and other emotions in the Creative Process
The figure was created based on data collected from our own research.

Relationship between Scared and Other Emotions:

1. Tense

There is a strong positive correlation ($\rho = .69$) between feeling scared and tense, meaning that as a person feels more scared, they tend to feel more tense. This correlation is statistically significant with a p-value of 0.002, which is lower than the standard threshold of 0.05 for statistical significance (Figure 11).

2. Disgusted

There is a moderate positive correlation ($\rho = .54$) between feeling scared and disgusted. This correlation is less strong than the previous one but still significant ($p = 0.025$).

3. Fearful

The correlation between feeling scared and fearful is strong ($\rho = .74$) and statistically significant ($p = 0.001$), indicating that people who feel scared also tend to feel fearful (Figure 11).

4. Embarrassed

The correlation between feeling scared and embarrassed is very strong ($\rho = .89$), being the highest in the table, and highly significant ($p = 0.000$), suggesting a very consistent relationship between these two emotions (Figure 11).

5. Nervous

Feeling scared is moderately correlated with feeling nervous ($\rho = .55$), with statistical significance ($p = 0.022$) (Figure 11).

6. Fearful

The correlation between feeling scared and fearful is very strong ($\rho = .94$), similar to the correlation with feeling embarrassed, and also highly significant ($p = 0.000$) (Figure 11).

7. Active

In contrast to the other emotions, feeling scared has a moderate negative correlation with being active ($\rho = -.51$), meaning that people who are more

scared tend to be less active. This correlation is also statistically significant (p = 0.037). In practical terms, these results suggest that when students feel more active during the creative process, they tend to experience lower levels of fear (associated with "Scared") (Figure 11).

8. Partial Conclusions

The emotion "Scared" appears to have a strong influence on other emotions in the creative context, especially those related to feelings of fear, shame, and overall fear.
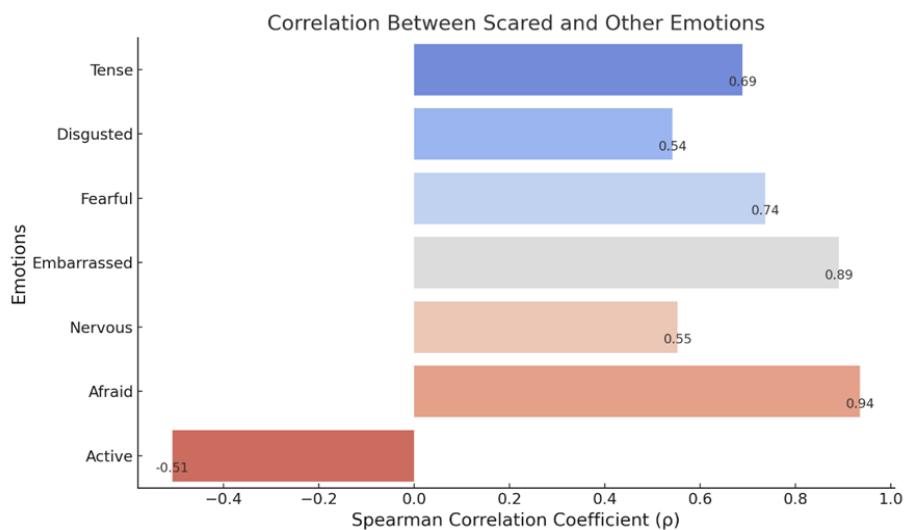

Figure 11 . Bar graph depicting the correlation between Scared and other emotions in the Creative Process
The figure was created based on data collected from our own research.

Relationship between Guilty and Other Emotions:

Embarrassed, Guilty

There is a moderately strong positive correlation ($\rho = .64$) between feeling guilty and embarrassed, with a p-value of 0.006, indicating statistical significance. On the other hand, the correlation between feeling guilty and fearful is slightly higher ($\rho = .66$), also significant (p = 0.004). The correlation between feeling guilty and scared is slightly lower ($\rho = .63$), but still indicates

a moderate positive relationship and is statistically significant ($p = 0.007$). The positive correlations suggest that a tendency to feel guilty is frequently accompanied by feeling embarrassed, fearful, and scared (Figure 12).
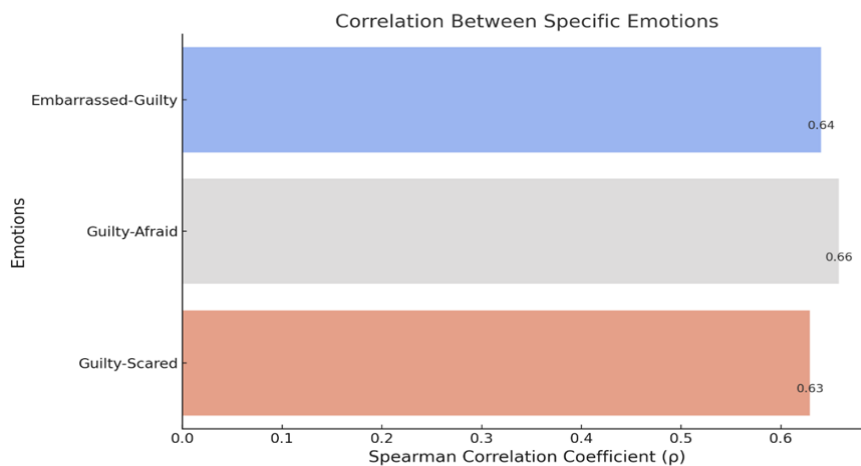

Figure 12 . Bar graph depicting the correlation between Scared and other emotions in the Creative Process
The figure was created based on data collected from our own research.

Relationship between Hostile and Other Emotions

Embarrassed

There is a moderate positive correlation ($\rho = .54$) between feeling hostile and embarrassed. In practical terms, feeling embarrassed is related to experiencing hostility during the creative process (Figure 13).

Collectively, these observations underscore the complexity and interconnectedness of emotions, particularly negative ones, during the creative process. This suggests that emotional experiences are not independent of each other and that emotions can be significantly intertwined in creative contexts.
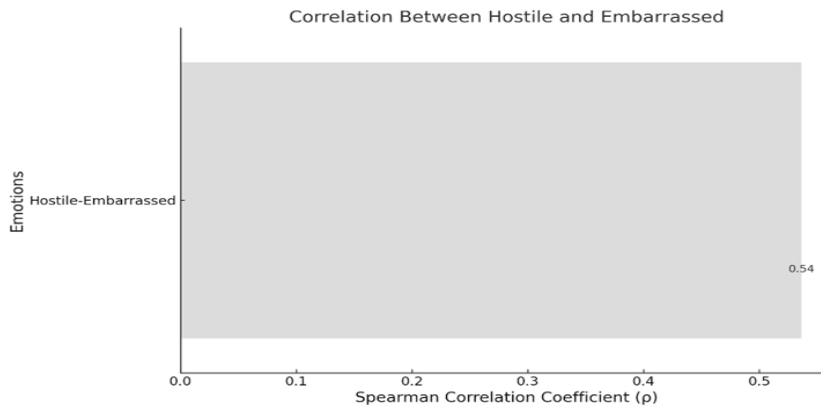
Figure 13 . Bar graph depicting the correlation between Hostile and Embarrassed in the Creative Process
The figure was created based on data collected from our own research.

Three fundamental temperament factors in children have been highlighted: extraversion, negative affect, and effortful control (Rothbart, 2012). Other authors (Watson, Clark, & Carey, 1988) emphasize two important terms related to affectivity: negative affect and positive affect, which are distinct dimensions related to mood, whether transient or stable. Negative affect is defined as a factor of subjective distress that manifests various emotions such as fear, contempt, disgust, anxiety, and hostility, while positive affect represents enthusiasm, interest, joy, and a high level of energy (Watson, et al., 1988).

The Positive and Negative Affect Schedule (PANAS) (Watson, et al. 1988) has been used to assess experiences of positive affective states. The PANAS is a 20-item measure based on a five-point Likert scale. Each item requires the participant to retrospectively rate the degree to which they felt a certain way (e.g., interested, inspired, etc.). Items range from "not at all" to "extremely" (Golby & Wood, 2016). Adequate psychometric properties have been reported for each of the four measures (Crocker, 1997; Iwanaga, Yokoyama, & Seiwa, 2004; Mäkikangas & Kinnunen, 2003; Schwarzer, Hahn, & Jerusalem, 1993).

In light of our discussion on the multifaceted nature of emotions in creative contexts, it is pertinent to consider the role of external stimuli in modulating these emotional responses. Recent findings by (Blasco-Magraner, Ros, Vicent, & Serra, 2023) contribute significantly to our understanding by demonstrating how music experiences can dynamically influence both positive and negative emotional states in educational settings. Their research, which specifically evaluated the impact of music on university students, found that music experiences could effectively enhance positive affect while mitigating negative emotions, thus supporting the broader hypothesis that environmental and sensory inputs can substantially alter emotional landscapes within learning environments (Blasco-Magraner et al. 2023). These insights could be instrumental in designing educational strategies that integrate sensory experiences to foster an emotionally conducive learning atmosphere, potentially enhancing creativity and emotional resilience.

The adoption of virtual reality (VR) has proven effective in enhancing both attention and emotional management in educational settings. A study by Perdana, Puspasari, Iqbal, & Hidayat (2024) highlights how VR transforms online learning by significantly modifying students' emotional and attention levels, thereby deepening understanding and enriching creative processes (Perdana et al., 2024). VR not only improves focus and learning retention through interactive experiences but also prepares students for real-life challenges by simulating complex emotional situations. This innovative approach could potentially redefine traditional educational methods by integrating crucial socio-emotional skills training.

Similarly, the effectiveness of cognitive reappraisal and distraction strategies in 14-year-old adolescents has been evaluated, for example, in response to images, revealing that the effectiveness of reappraisal varied depending on the type of emotion, being more effective than distraction in managing fear or anxiety provoked by threat images, while for other emotions, its effectiveness was comparable to that of distraction. Age

differences in the effectiveness of these strategies and their daily use were also examined using the Cognitive Emotion Regulation Questionnaire. Older adolescents reported using distraction les (Theurel & Gentaz, 2018).

From other areas, the specificities of emotion perception and the psycholinguistic characteristics of the expression of basic emotions have been determined, for example, in adolescents with intellectual disabilities and from a gender perspective (Vovchenko, 2020).

In terms of the importance of emotions among adolescents, studies have been conducted showing, for example, that reactive aggression is characterized by significant daily emotionality, while proactive aggression is characterized by lack of emotionality (Moore, Hubbard, Bookhout, & Mlawer, 2019).

It is also interesting that inclusive education has been shown to benefit from promoting friendships among students, with and without special educational needs, as well as socio-moral competencies in adolescents, positively relating friendship closeness to inclusive attitudes (Grütter, Gasser, & Malti, 2017).

Conclusions

The study explored the complex network of emotions in the creative process, highlighting how different emotions interact with each other. The results show an inversely proportional relationship between tension and enthusiasm, evidenced by a Spearman correlation coefficient (ρ) of -0.561, suggesting that high levels of tension may decrease enthusiasm in creative activities. Additionally, it was identified that tension is positively associated with negative emotions such as disgust, fear, shame, anxiety, and fear, implying that an increase in tension could increase these negative emotions, potentially affecting creative performance.

On the other hand, the feeling of being ashamed showed a strong connection with feeling tense, disgusted, and fearful, which could indicate

that shame amplifies other negative emotions in learning and creative contexts. This underscores the importance of addressing shame and other negative emotions in educational settings to foster a more conducive climate for creativity.

A moderate positive correlation was observed between feeling inspired and emotions such as disgust and pride, which is intriguing as it suggests that inspiration can coexist with some discomfort, possibly due to the challenging nature of creative tasks that require stepping out of comfort zones. The strong connection between inspiration and pride reflects how the generation of creative ideas can be a significant source of personal satisfaction.

The analysis also revealed that nervousness is significantly associated with fear and shame, which may have implications for how students approach creative projects under uncertainty or critical self-evaluation. This highlights the need for support strategies that mitigate nervousness and foster a more positive approach to creative exploration.

Furthermore, it was found that stimulation and interest are positively correlated, implying that increased stimulation can enhance interest in creative activities. This relationship underscores the value of designing educational experiences that stimulate and captivate students' attention.

Decision-making and enthusiasm showed a significant positive relationship, suggesting that clarity and determination in goals can enhance enthusiasm for creative work. Attention and pride were also strongly linked, indicating that concentration and commitment to a task can lead to a sense of achievement.

Interestingly, fear, represented by emotions such as being fearful or scared, showed an extensive network of correlations with other emotions, both positive and negative, highlighting its influence on the emotional dynamics of the creative process. The presence of fear can affect activity and participation in the creative process, underscoring the importance of addressing and managing fears to facilitate creativity.

Finally, guilt and hostility also showed significant correlations with other negative emotions, such as shame and fear, highlighting how these emotions can interconnect and affect students' emotional well-being and creativity.

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