

Climate Scale for Creativity in the Classroom: Evidence of Factorial Validity in the Portuguese Context

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Abstract

Creative abilities are a requirement for the present and can be intentionally promoted from the beginning of the life course. The school environment appears as privileged in this promotion, being the facilitation of a creative climate in the classroom one of the ways to operationalize it. This climate can be investigated from the perspective of the students. The purpose of this study was to adapt, for the Portuguese context, the Classroom Climate for Creativity Scale, designed in Brazil. Four hundred and thirty-six students from 3rd and 4th grade participated in the study (Mean age=9 years old). The results indicate an instrument with 22 items, to be answered on a 5-point Likert scale, which evaluates four factors (Teacher Support for Expression of Student Ideas, Student Self-perception of Creativity, Student Interest in Learning, Student Autonomy). The alpha reliability coefficients varied from .52 to .80. It may be useful in investigations on the perception of Portuguese students about creative teaching practices and on the self-evaluation of creativity, as well as for diagnosing the climate for creativity in the classroom.

Keywords: Creative climate, scale, validation, classroom, children.

Escala Clima para Criatividade em Sala de Aula: Evidência de Validade Fatorial no Contexto Português

Resumo

Habilidades criativas são um requisito para a atualidade e podem ser intencionalmente promovidas desde o início do percurso de vida. O ambiente escolar surge como privilegiado nessa promoção, sendo a facilitação de um clima criativo em sala de aula uma das formas de operacionalizá-la. Esse clima pode

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ser investigado sob a ótica dos alunos. O objetivo deste estudo foi adaptar, para o contexto português, a Escala sobre o Clima para a Criatividade em Sala de Aula, desenvolvida no Brasil. Participaram da pesquisa 436 alunos dos 3º e 4º anos de escolaridade (idade média=9 anos). Os resultados mostram um instrumento com 22 itens, a serem respondidos em uma escala Likert de 5 pontos, a qual avalia quatro fatores (Suporte do Professor à Expressão de Ideias do Aluno, Autopercepção do Aluno com Relação à Criatividade, Interesse do Aluno pela Aprendizagem, Autonomia do Aluno). Os coeficientes alfa de fidedignidade variaram de 0,52 a 0,80. Ela pode ser útil em pesquisas sobre a percepção de alunos portugueses sobre práticas incentivadoras à criatividade por parte dos docentes e sobre a autoavaliação de criatividade, bem como para fins de diagnóstico do clima para criatividade em sala de aula.

Palavras-chave: Clima criativo, escala, validação, sala de aula, crianças.

Escala Clima para la Creatividad en la Clase: Evidencia de Validez Factorial en el Contexto Portugués

Resumen

Las habilidades creativas son un requisito para la actualidad y pueden promoverse intencionalmente desde el inicio del recorrido de la vida. El ambiente escolar surge como privilegiado en esta promoción, siendo la facilitación de un clima creativo en el aula una de las formas de operacionalizarla. Este clima puede ser investigado bajo la óptica de los alumnos. El objetivo de este estudio fue adaptar al contexto portugués, el clima escala para la creatividad en el aula, desarrollado en Brasil. Participaron de la encuesta 436 alumnos de los 3º y 4º años de escolaridade (edad media=9 años). Los resultados muestran un instrumento con 22 ítems, a ser respondidos en una escala likert de 5 puntos, que evalúa cuatro factores (Apoyo a la Expresión de Ideas del Alumno, Autopercepción de creatividad, Interés del Alumno por el Aprendizaje, Autonomía del Alumno). Los coeficientes alfa de fidedignidade variaram de 0.52 a 0.80. Puede ser útil en la investigación sobre la percepción de los estudiantes portugueses sobre las prácticas de enseñanza que fomentan la creatividad y la autoevaluación de la creatividad, así como para fines de diagnóstico del clima para la creatividad en el aula.

Palabras clave: Clima creativo, escala, validación, clase, niños.

In the 1950s, Guilford encouraged research on creativity, showing the relevance of this construct to various domains, including education. Since then, the study of creativity would no longer be the same, growing, gaining scientific credibility and diversifying (Alencar, 2015). In the 21st century, creativity is not only considered important, but it has also gained the status of essential, a requirement for the world today, according to Lambert (2017). Other authors associate being creative today to an issue of survival (Miller & Dumford, 2014). This need is underlined given the accelerated and unpredictable transformations the world imposes on the ordinary citizen and on the leadership of the socio-political and scientific-technological contexts: there will be no way to cope with such

a world effectively without creative problem-solving skills (Williams, Runco, & Berlow, 2016).

Creativity is understood here based on the standard definition by Runco and Jaeger (2012), which joins the agreement of several authors until date. According to that definition, creativity operates in simultaneously effective and original ideas and products. For its part, being creative has been presented as an inherent potential for all individuals and can be developed in an intentional and systematic way (Runco, 2014) throughout the life course and at the various levels of education (Cromptley, 2015; Kaufman, 2016; Silva & Nakano, 2012).

The promotion of creative abilities can and should be initiated in the first years of life (Russ

& Lee, 2017). If the creativity development trajectories are taken, its first manifestations, around the age of 2-3 years, seem to be clear in symbolic play (Vygotsky, 2004) and, in the course of childhood, there are declines and recoveries in these manifestations, about the ages of which authors do not always agree (Besançon, Lubart, & Barbot, 2013; He & Wong, 2015). In the justifications for such oscillations, however, the importance of environmental dimensions has been frequently mentioned, such as the requirement and awareness of norms, the adaptation to more or less conventional behaviors or to the structure of presented activities (Alencar, Braga, & Marinho, 2016; Besançon et al., 2013).

Consequently, a context that prevails in childhood for an intentional development of creativity is the school (Baer, 2016; Starko, 2014). This context is made up of multiple influences, allows multiple acquisitions of knowledge and skills, and this is where the child spends most of his/her time (Soulé & Warrick, 2015)". The teacher also plays a central role in modeling attitudes and behaviors, which may impact on the promotion or inhibition of creative expression (Omdal & Graefe, 2017; Sierra, Escobedo, Cuervo, & Rosal, 2015). As Romo (2008, p. 89) pointed out, "the school is a good bed of creative minds", in which the adults' creativity largely depends on how they exercised it as children. For Glaveanu (2018), it is more important for the teacher to see how the students are creative than to inquire how creative they are. Thus, different ways of thinking about creativity and being creative would be valued in the classroom.

Thus, the promotion of a creative environment is relevant, that is, an environment in which the school promotes creativity in the individuals, particularly in the classroom (Wechsler, Oliveira, & Tonete-Suárez, 2015). Research on this type of environment has emerged in the domain of business organizations (Hong, Chang, & Chai, 2014), having been less developed in the educational context despite its claimed relevance (Santos & Fleith, 2015; Tan et al., 2015).

What can one consider to be a creative classroom climate? Its contours can be established, thinking of the promotion of facilitating conditions and the impediment of obstacles to creativity. In both cases, the boundaries between pedagogical practices and teacher profile or between external and personal aspects of the student are difficult to assume, and there is no independence between these conditions (Nehaedani, Mormoosavi, Sani, Tabarraei, & Ghodrati, 2013). Psychological characteristics are interacting with environmental contingencies in a continuous model throughout life (Alencar & Formiga-Sobrinho, 2017).

As facilitating conditions of creative expression in the classroom, one can firstly refer to a relationship in the class, among all the actors, determined by mutual acceptance, safety and well-being. In this context, the interests and abilities of the students should be valued, making their learning meaningful (assimilation of the knowledge into the student's daily life should be possible) and promoting self-esteem and autonomy. The students will thus have space to express their ideas, affirm themselves, take risks and criticize. Inquiry should also be encouraged, facilitating curiosity, as well as humor and the play dimension in parallel with the incentive to responsibility (Alencar et al., 2016; Fleith & Morais, 2017). Long-term curricular planning, balance between freedom and structure, flexible use of the classroom space and a good teacher-student relationship can also favor creativity in the school context (Davies et al., 2014).

A climate that promotes creativity should also explicitly convey the appreciation and stimulation of creative responses, without fearing student divergence, and focus on the connectivity and interdisciplinarity of teaching practices, as well as an atmosphere of collaboration and dialogue (Harris & de Bruin, 2018). Such creative responses, in turn, require time: to assimilate and relate knowledge, to reflect, to generate ideas and not just reproduce them. In view of this work of the student, the teacher should also provide continuous and constructive feedback (Fleith & Morais, 2017).

The range of proposed tasks, materials, instruction techniques and forms of evaluation facilitates, together with the conditions described above, something fundamental to creative expression: the motivation for what the student is proposed to accomplish. Creativity requires motivation, especially intrinsic (Grohman & Snyder, 2017; Hennessey & Amabile, 2010; Jesus, Rus, Lens, & Imaginário, 2013). Only a motivated student commits and engages in challenges that demand the discovery of new mental pathways and new solutions (creative problem solving).

Teachers who create and manage a creative climate (which they also belong to) are then persons who, regardless of their individual creativity, can understand and adapt to a particular class context and foster creativity in their pedagogical practice (Davies et al., 2014; Glaveanu, 2018). In addition to the environment to be managed with the outlines already exposed, there are characteristics of the creative person that any teacher needs to have and use in their classroom action (Cropley, 2015). They need to be dynamic, critical, open-minded, self-confident and persistent teachers (Alencar et al., 2016; Cropley, 2015). Thus, they will know how to creatively use what the curriculum allows for student development and position themselves critically towards their practices and the school context (Bramwell, Reilly, Lilly, Kronish, & Chennabathni, 2011; Sierra et al., 2015).

Many gaps still remain though in the implementation of teaching aimed at the development of creative potential (Sternberg, 2015). Some of these difficulties relate to the pressure to comply with the curricula, the distribution of school days, the type of evaluation, the training of teachers or the material conditions of the school. At the same time, teaching is still centered on a standardized methodology that favors rational, logical and verbal skills, promotes memorization, competition and the convergent production of responses, to the detriment of a process of broadening possibilities based on error, encouragement and collaboration, as well as the valuation of divergence, opportunity for

expression, and choice (Bahia & Trindade, 2013; Cho, Pemberton, & Ray, 2017).

The climate in favor of or against creativity in the classroom should be evaluated, helping to raise awareness of needs and expectations, based on which educational practices can be reinforced or changed (Krumm, Vargas-Rubilar, Lemos, & Oros, 2015). Investigating what students think about creativity, how they assess the classroom climate, and the extent to which teaching practices favor creative behaviors are possible ways to better understand the phenomenon of creativity in the school context (Beghetto & Plucker, 2016; Morais & Fleith, 2017; Nakano, 2018).

In the literature review, some instruments were identified, aimed at teachers, who evaluate aspects of the classroom climate for creativity. For example, Richardson and Mishra (2018) proposed an instrument called SCALE: Support for Creativity in a Learning Environment to help educators create learning environments that promote student creativity. The instrument evaluates three factors: Learner Engagement, Physical Environment, and Learning Climate. The SCALE consists of 14 items, answered on a Likert scale ranging from 0 (no evidence) to 3 (high evidence). Examples of instrument items are: “a variety of resources are available to students”, “the atmosphere is collaborative and friendly”, “students are given time to develop ideas and creative thinking”. The credibility of the measure was obtained through the triangulation of three sources of information: literature review, observation of teaching practice and feedback from the manager. However, to further assess the reliability and validity of the scale, future studies need to be conducted.

In addition, Soh (2017) elaborated The Creativity Fostering Teacher Behavior Scale (CFTIndex) to guide teachers on how to create classroom conditions that stimulate creativity. For the author, teachers need to be aware of the possible paths to develop student creativity. The instrument evaluates nine classroom characteristics, distributed among 45 items: independence, integration, motivation, judgment,

flexibility, evaluation, question, opportunities and frustration. Example items: “In my class, students have opportunities to share ideas and views”; “My students who are frustrated can come to me for emotional support”; “I encourage students to show me what they have learned on their own”. The instrument reliability coefficient is 0.82.

In Brazil, the Classroom Creativity Climate Scale (Fleith & Alencar, 2005) was elaborated, evaluating the teacher’s support for the production and expression of the student’s ideas, the student’s self-perceived creativity, the student’s autonomy at school and the student’s interest in learning in this context, from the students’ perspective. Good psychometric characteristics were found and some studies were conducted, namely in Brazil and Portugal, taking the application of this scale to the first education cycle (Dias, 2014; Leite, 2017; Santos & Fleith, 2015). In the case of Portugal, linguistic adaptations of the scale were made, but there is still no validated assessment instrument for the country about the climate that facilitates creativity in the classroom. The purpose of this study was to present the stages of adaptation to Portugal of the Classroom Creativity Climate Scale (Fleith & Alencar, 2005).

Method

Participants

The sample consisted of 436 students (51.4% girls and 48.6% boys) from public and private primary schools in the districts of Porto, Aveiro and Braga, Portugal. The students attended the 3rd (47%) and the 4th (53%) grades. In the 3rd grade, 97.6% of the students were between 8 and 9 years old (and five students of 10 and 11 years old failed and were attending 3rd grade for the second time); in the 4th grade, 97.4% were between 9 and 10 years old (and 6 students aged 11 and 12 years failed and were attending 4th grade for the second time).

Instrument

The Climate Scale for Classroom Creativity (Fleith & Alencar, 2005) was used, consisting of

22 items on a five-point Likert scale (responses between “never” and “always”). These items are organized into five factors: Factor I - Teacher Support for Expression of Student Ideas with five items (example item: “The teacher pays attention to my ideas”), Factor II - Student Self-perception of Creativity with four items (example item: “I use my imagination”), Factor III - Student Interest in Learning with six items (example item: “I like the subject taught”), Factor IV - Student Autonomy with four items (example item: “I can choose what I want to do”), Factor V - Teacher’s Encouragement for the Production of Student Ideas with three items (example item: “The teacher asks me to think of new ideas”). The internal consistency coefficients of the scale (Cronbach’s alpha coefficients) range between .55 and .73 and the factors explain 31% of the variance in the results. This instrument was revised for the sake of adaptation to Portuguese from Portugal and was subsequently evaluated by independent experts to validate this linguistic adaptation. There is no preset time for how long it takes to apply the scale. The instrument also included questions regarding demographic data from the respondents (i.e., age, grade, etc).

Data Collection Procedures

The application of the instrument, conducted by a Psychology graduate, took place in a classroom context, without the presence of the teacher, and took about 30 minutes. Previously, the students received explanations about the objective of the activity, guaranteeing the confidentiality and anonymity of the applied scale, as well as its non-evaluative nature in the academic sense. Concerning the instructions, students were informed that they only needed a pen and that they could not look at or ask their colleagues. Next, the instructions were read and the two examples on the first page of the instrument were solved in the group.

Data Analysis

For the analysis of the data, an exploratory factor analysis of the scale items was carried out, with the 25nd version of SPSS (Statistical Package for Social Sciences), using the princi-

pal components method and proceeding to a varimax rotation. The Cronbach's alpha reliability coefficient was also calculated.

Ethical Procedures

Meetings were held with the directors of the schools, when the research instrument was presented, as well as the data collection and analysis process. The anonymity and confidentiality of all data were guaranteed. As part of the sample belongs to the public school network, authorization was requested from the Directorate General of Education - the entity within the Portuguese Ministry of Education responsible for the implementation of policies regarding the curricular and didactic components of Portuguese education - to apply the scale in the research sample. At the same time, the responsible caregivers were asked to provide written authorization for their students' participation. The responsible teachers collected these authorizations.

Results

Table 1 presents the factor analysis results of the scale items. No more than 2% of missing cases were found per variable. A principal component analysis (PCA) using the Kaiser-Meyer-Olkin index (KMO) and Bartlett's Sphericity Test was done. The results allowed corroborating the adequacy of the correlation matrix, with the following values being observed: KMO = .92; Bartlett's Sphericity Test, χ^2 (231) = 2934,646; $p < .001$. No items were eliminated (.30 was used as the threshold of the saturation indices). The analysis resulted in the extraction of four factors and, thus, no factor emerged that corresponded to the Teacher's Encouragement for the Production of Student Ideas in the original version of the instrument. The factorial structure found explains 50.4% of the variance in the results. The first factor explains 31.82% and the remaining variance percentages are 6.85%, 6.38%, and 5.34%. All eigenvalues are superior to one. The items retained and organized according to the factor loading in the respective factor are listed in Table 1.

Factor I integrates seven items related to the Student Interest in Learning, integrating the six items from the original version and one item from the Self-perception of Creativity ("I'm proud of myself"). This item may not necessarily translate into a self-perception of creativity and has been inserted in this version as a consequence related to the learning experienced.

Factor II joins nine items and is named Teacher Support for Expression of Student Ideas, grouping the five items from the original version, three that belonged to the (eliminated) factor Encouragement for the Production of Ideas ("The teacher asks me to think about new ideas", "The teacher asks me to try when I do not know the answer to a question", "The teacher asks me to think about many ideas") and one item that belonged to the Student Autonomy factor in this same version ("The teacher asks me to show my work to the other students"). All items of this factor belonging to other factors in the original scale seem to fit into the Teacher Support for Expression of Student Ideas.

Factor III, named Student Self-perception of Creativity, grouped the three remaining items of the original scale. All items clearly refer to a student's self-assessment regarding the creativity dimensions.

Factor IV, corresponding to Student Autonomy, is organized into three remaining items that belonged to this factor in the original instrument. All items clearly translate expressions of student autonomy.

Next, an analysis of the results is presented, taking the items of each factor, indicating the mean and the standard deviation, along with the corrected correlation of the item with the total of the subscale (internal validity). This presentation looks at each dimension separately. Thus, in Table 2, the results of the same analysis for the items of the Factor Student Interest in Learning are presented. The averages in the items of this dimension are about four, approaching the extreme of the Likert scale used; even so, there is a good dispersion of results, with the standard deviation around the unit. The internal validity is satisfactory. On the whole, the alpha coefficient of this factor is .80.

Table 1
Factor Analysis of the Scale Items

Items	Factors				h^2
	I	II	III	IV	
1. The teacher pays attention to my ideas.		.71			.55
3. My ideas are welcomed.		.64			.55
14. The teacher asks me to think of new ideas.		.62			.43
21. The teacher asks me to think of many ideas.		.62			.50
12. The teacher cares about what I have to say.		.54			.47
5. The teacher asks me to show my work to other students.		.49			.45
19. The teacher asks me to try when I do not know the answer to a question.		.49			.42
7. The teacher gives me enough time to think about a story I have to write.		.44			.42
2. I have a chance to participate in many activities.		.42			.34
13. I like the content taught.	.75				.58
15. I learn about things that I really like.	.70				.58
18. I learn many things.	.69				.56
20. I am proud of myself.	.58				.45
11. When I start a task, I like to finish it.	.57				.41
9. Schoolwork is fun.	.53				.42
22. I use books for research when I want to know more about a topic.	.52				.43
10. I have many ideas.			.80		.41
6. I think I am creative.			.77		.70
8. I use my imagination.			.71		.62
16. I can make choice about I want to do.				.72	.56
17. I get so interested in my schoolwork that I do not know what is happening around me.				.62	.48
4. I try do things in different ways.				.56	.46
Eigenvalues	7.00	1.51	1.40	1.18	
% Variance	31.82	6.85	6.38	5.34	

Table 3 describes the results in the items of the Teacher Support for Students Expression of Ideas dimension. The item scores suggest an average slightly superior to the midpoint of the scale, and an appropriate variance, as the standard deviation approaches the unit. On the other hand, all items seem to be positive and moderately correlated with the total of the

subscale. The alpha coefficient of this nine-item factor corresponds to .80.

Table 4 shows the results for the items of the Factor Student Self-Perception of Creativity. As can be observed, the average item scores are slightly superior to the midpoint of the scale used and a good dispersion of the results is observed, with the standard deviation approaching the unit.

Table 2
Items Analysis of the Student Interest in Learning Factor

Items	<i>M</i>	<i>SD</i>	<i>itc</i>
9. Schoolwork is fun.	4.14	.934	.59
11. When I start a task, I like to finish it.	4.34	.937	.57
13. I like the content taught.	4.37	.862	.57
15. I learn about things that I really like.	4.26	.889	.62
18. I learn many things.	4.68	.615	.58
20. I am proud of myself.	4.34	.936	.59
22. I use books for research when I want to know more about a topic.	3.74	1.188	.59
Factor	4.27		

Table 3
Items Analysis of the Teacher Support for Expression of Student Ideas Factor

Items	<i>M</i>	<i>SD</i>	<i>itc</i>
1. The teacher pays attention to my ideas.	4.08	.919	.56
2. I have a chance to participate in many activities.	4.09	.885	.51
3. My ideas are welcomed.	3.83	1.037	.64
5. The teacher asks me to show my work to other students.	3.21	1.155	.52
7. The teacher gives me enough time to think about a story I have to write.	4.35	.867	.60
12. The teacher cares about what I have to say.	4.10	1.040	.65
14. The teacher asks me to think of new ideas.	3.86	1.049	.53
19. The teacher asks me to try when I do not know the answer to a question.	4.51	.862	.52
21. The teacher asks me to think of many ideas.	4.51	.862	.53
Factor	4.00		

Table 4
Items Analysis of the Student Self-perception of Creativity Factor

Items	<i>M</i>	<i>SD</i>	<i>itc</i>
6. I think I am creative.	3.86	1.034	.57
8. I use my imagination.	4.23	.933	.57
10. I have many ideas.	3.57	.033	.56
Factor	3.88		

The three items present moderate correlations with the total factor. The alpha reliability coefficient was good (.77).

Finally, Table 5 presents the results obtained in the items of the Student Autonomy dimension. The internal validity is satisfactory, always with item-total correlation values higher

than .38. The average item scores approximate the midpoint of the score distribution among five levels, and the dispersion of the results is satisfactory as illustrated by the standard deviation. It is the factor that demonstrates the lowest alpha reliability coefficient (.52), similar to the original scale.

Table 5
Items Analysis of the Student Autonomy Factor

Items	<i>M</i>	<i>SD</i>	<i>itc</i>
4. I try to do things in different ways.	3.45	1.118	.46
16. I can make choices about what I want to do.	2.75	1.095	.38
17. I get so interested in my schoolwork that I do not know what is happening around me.	3.21	1.226	.51
Factor	3.14		

The Classroom Creativity Climate Scale, in its Portuguese version, consists of 22 items, distributed in four factors. The internal consistency of the instrument is good, translating into a Cronbach alpha of .89.

Discussion

The creative climate as a facilitator of individual creative abilities has been researched for decades (Amabile, 1996; Isaksen, 2007). It appears to be relevant in the school context, namely in the classroom (Beghetto & Kaufman, 2014; Davies et al., 2014). It is then important to identify promising and harmful conditions in this space, in order to change educational practices. One of the ways to examine the extent to which the classroom climate favors creativity is through student assessment (Alencar, Bruno-Faria, & Fleith, 2014; Nakano, 2018). There is a limited number of instruments to put this evaluation in practice though. This scenario led us to develop the present study, aiming to adapt a scale to assess the creative climate in the classroom for Portuguese children in the first cycle of education.

In view of the Brazilian version of the Classroom Creativity Climate Scale (Fleith &

Alencar, 2005), four factors were maintained: Student Interest in Learning, Support for Expression of Student Ideas, Self-perception of Creativity, Student Autonomy) and one was eliminated (Teacher's Encouragement for the Production of Student Ideas). The instrument also maintained the original 22 items, answered on a five-point Likert scale. Although these four factors correspond to the factors the authors identified in the original version of the scale and the total number of items remained the same, there was not a total match of the items with the factors in both versions and one factor was eliminated. It was observed that, in both Portuguese and Brazilian versions, the factor with the lowest average was Student Autonomy, which may indicate the need for this facet to be further encouraged at this level of education or a lesser understanding of the children in this age group about the concept involved in this factor. With regard to the highest average, the factor Student's Interest in Learning ranked highest in the two versions. Similar results were found in a Brazilian study conducted by Fleith (2016) involving 4th grade students. The psychometric characteristics of the instrument were good and there were very satisfactory indicators of internal consistency of the items (three factors

with Cronbach's alpha between .77 and .80), except for one (alpha of .52, corresponding to one of the factors with a reduced number of items). The factorial structure studied explained 50.4% of the variance in the results. The results obtained in this study suggest that the Classroom Creativity Climate Scale can be applied to the student population in the last years of the first cycle of education in Portugal. This instrument can be useful in research on these individuals' perception about the teachers' practices to encourage creativity and on the self-evaluation of creativity. It will also be relevant to systematize knowledge for continuing teacher training, an important process for these professionals to facilitate creativity in their practices (Alencar, 2015).

Further research using this instrument is relevant in Portugal, using broader samples, particularly considering more advanced students, as children in the first years of the first cycle may have difficulty understanding the scale items (Fleith, 2010). Studies comparing gender, school years or types of schools (public/private) may also help improve classroom practices towards facilitating creativity. Another suggestion is to correlate the four factors measured by the instrument with other variables related to creativity such as motivation, thinking styles, self-concept, and personality traits (Alencar et al., 2016; Amabile, 1996; Cropley, 2015). Furthermore, future studies can be conducted in order to examine the convergent validity of the instrument with other scales. A structural equation modeling analysis may be used to confirm the structure that was found in the present study. As limitations of the study, we highlight a lower reliability coefficient in the Student Autonomy factor. Perhaps a review of the wording of the items, or the preparation and insertion of new items, may somewhat reverse this situation. Other limitations are the administration of self-report measures alone (social desirability may influence the responses) and the use of non-probabilistic sample. From the viewpoint of the practical implications of the research, it is worth emphasizing the usefulness of the scale

for diagnostic purposes in Portuguese schools, considering the extent to which creativity has been implemented in classrooms, generating indicators that can support actions to reformulate or maintain pedagogical strategies for creativity.

This instrument may offer educators information to aid in the design of learning environment that could enhance student's creativity. Its focus is on the assessment of the classroom environment instead of the individual level of creativity. Nowadays, it is imperative to invest in the transition from standardized and traditional teaching to a paradigm of creative education (Beghetto & Kaufman, 2016). It is hoped that it will help to meet the challenges of 21st-century classrooms (Patston, Cropley, Marrone, & Kaufman, 2017).

Authors' Contributions

Substantial contribution in the concept and design of the study: Fatima Morais.

Contribution to data collection: Fernanda Viana; Carla Dias.

Contribution to data analysis and interpretation: Fernanda Viana; Fatima Morais.

Contribution to manuscript preparation: Denise Fleith.

Contribution to critical revision, adding intellectual content: Denise Fleith.

Conflicts of interest

The authors declare that they have no conflict of interest related to the publication of this manuscript.

References

- Alencar, E. M. L. S. (2015). Promoção da criatividade em distintos contextos: Entraves e desafios. In M. F. Morais, L. Miranda, & S. Wechsler (Eds.), *Criatividade: Aplicações práticas em contextos internacionais* (pp. 15-32). São Paulo, SP: Vetor.
- Alencar, E. M. L. S., Braga, N. P., & Marinho, C. D. (2016). *Como desenvolver o potencial criador*. Petrópolis, RJ: Vozes.
- Alencar, E. M. L. S., Bruno-Faria, M. F., & Fleith, D. S. (2014). The measurement of creativity:

- Possibilities and challenges. In E. M. L. S. Alencar, M. F. Bruno-Faria, & D. S. Fleith (Eds.), *Theory and practice of creativity measurement* (pp. 1-20). Waco, TX: Prufrock Press.
- Alencar, E. M. L. S., & Formiga-Sobrinho, A. B. (2017). *A gestão da criatividade*. Curitiba, PR: Prismas.
- Amabile, T. M. (1996). *Creative in context*. Boulder, CO: Westview Press.
- Baer, J. (2016). *Domain specificity of creativity*. London: Academic Press.
- Bahia, S., & Trindade, J. P. (2013). Transformar o velho em novo: A integração da criatividade na educação. In F. H. Piske & S. Bahia (Eds.), *Criatividade na escola: O desenvolvimento de potencialidades, altas habilidades e talentos* (pp. 15-32). Curitiba, PR: Juruá.
- Beghetto, R. A., & Kaufman, J. C. (2014). Classrooms contexts for creativity. *High Ability Studies*, 25(1), 53-69. doi: 10.1080/13598139.2014.905247
- Beghetto, R. A., & Kaufman, J. C. (Eds.). (2016). *Nurturing creativity in the classroom*. New York: Cambridge University Press.
- Beghetto, R. A., & Plucker, J. A. (2016). Revisiting the relationship among schooling, learning, and creativity. In J. C. Kaufman & J. Baer (Eds.), *Creativity and reasoning in cognitive development* (pp. 72-91). New York: Cambridge University Press.
- Besançon, M., Lubart, T., & Barbot, B. (2013). Creative giftedness and educational opportunities. *Educational and Child Psychology*, 30(2), 79-88. Retrieved from <http://public-montessori.org/wp-content/uploads/2017/03/Besancon-Lubart-Barbot-2013-Creative-giftedness-and-educational-opportunities.pdf>
- Bramwell, G., Reilly, R. C., Lilly, F. R., Kronish, N., & Chennabathni, R. (2011). Creative teacher. *Roeper Review*, 33(1), 228-238. doi: 10.1080/02783193.2011.603111
- Cho, H., Pemberton, C. L., & Ray, B. (2017). An exploration of the existence, value and importance of creativity education. *Current Issues in Education*, 20(1). Retrieved from <http://cie.asu.edu/ojs/index.php/cieatasu/article/view/1537>
- Cropley, A. (2015). *Creativity in education and learning. A guide for teachers and educators*. New York: Routledge
- Davies, D., Jindal-Snape, D., Digby, R., Howe, A., Collier, C., & Hay, P. (2014). The roles and development needs of teachers to promote creativity: A systematic review of literature. *Teaching and Teacher Education*, 41(1), 34-41. doi: 10.1016/j.tate.2014.03.003
- Dias, C. A. F. (2014). *Criatividade no Ensino Básico: Um olhar sobre as representações de alunos e de professores em escolas de diferentes contextos socioeconômicos* (Master's thesis, Universidade do Minho, Instituto de Educação, Braga, Portugal).
- Fleith, D. S. (2010). Avaliação do clima para a criatividade em sala de aula. In E. M. L. S. Alencar, M. F. Bruno-Faria, & D. S. Fleith (Eds.), *Medidas de criatividade* (pp. 55-66). São Paulo, SP: Artmed.
- Fleith, D. S. (2016). Criatividade, motivação para aprender, ambiente familiar e superdotação: Um estudo comparativo (Special issue). *Psicologia: Teoria e Pesquisa*, 32, 1-9. doi: 10.1590/0102-3772e32ne211
- Fleith, D. S., & Alencar, E. M. (2005). Percepção de alunos do ensino fundamental quanto ao clima de sala de aula para criatividade. *Psicologia em Estudo*, 11(3), 513-521. Retrieved from <http://www.scielo.br/pdf/pe/v11n3/v11n3a06>
- Fleith, D. S., & Morais, M. F. (2017). Desenvolvimento e promoção da criatividade. In L. S. Almeida (Ed.), *Criatividade e pensamento crítico: Conceito, avaliação e desenvolvimento* (pp. 45-73). Porto, Portugal: Centro de Estudos e Recursos em Psicologia.
- Glaveanu, V. P. (2018). Educating which creativity? *Thinking Skills and Creativity*, 27(1), 25-32. doi: 10.1016/j.tsc.2017.11.006
- Grohman, M. G., & Snyder, H. T. (2017). Why do we create? The roles of motivation, mindset, and passion in human creativity. In J. A. Plucker (Ed.), *Creativity & innovation. Theory, research, and practice* (pp. 165-179). Waco, TX: Prufrock Press.
- Guilford, J. P. (1950). Creativity. *American Psychologist*, 5(9), 444-454. doi: 10.1037/h0063487
- Harris, A., & de Bruin, L. R. (2018). Secondary school creativity, teacher practice and STEAM education: An international study. *Journal of Educational Change*, 19(2), 153-179. doi: 10.1007/s10833-017-9311-2

- Hennessey, B. A., & Amabile, T. (2010). Creativity. *Annual Review of Psychology, 61*(1), 569-598. doi: 10.1146/annurev.psych.093008.100416
- He, W., & Wong, W. (2015). Creativity slump and school transition stress: A sequential study from the perspective of the cognitive-relational theory of stress. *Learning and Individual Differences, 43*(1), 185-190. doi: 10.1016/j.lindif.2015.08.034
- Hong, H. Y., Chang, Y. H., & Chai, C. S. (2014). Fostering a collaborative and creative climate in a college class through idea-centered knowledge building. *Instructional Science, 42*(3), 389-407. doi: 10.1007/s11251-013-9289-y
- Isaksen, S. (2007). The climate for transformation: Lessons for leaders. *Creativity and Innovation Management, 16*(1), 3-15. doi: 10.1111/j.1467-8691.2007.00415.x
- Jesus, S. N., Rus, C., Lens, W., & Imaginário, S. (2013). Creativity and intrinsic motivation: A meta-analysis of the studies between 1990-2010. *Creativity Research Journal, 25*(1), 80-84. doi: 10.1080/10400419.2013.752235
- Kaufman, J. C. (2016). *Creativity 101*. New York: Singer.
- Krumm, G. L., Vargas-Rubilar, J. A., Lemos, V. N., & Oros, L. B. (2015). Percepción de la creatividad en niños, padres y pares: efectos en la producción creativa. *Pensamiento Psicologico, 13*(2), 21-32. <http://dx.doi.org/10.11144/Javerianacali.PPSI13-2.pcnp>
- Lambert, P. A. (2017). Understanding creativity. In J. B. Cummings & M. L. Blatherwick (Eds.), *Creative dimensions in teaching and learning in the 21st century. Advances in creativity and Giftedness* (pp. 1-21). Rotterdam, The Netherlands: Sense. doi: 10.1007/978-94-6351-047-9_1
- Leite, C. (2017). *Criatividade e representações do clima criativo em sala de aula: Um estudo exploratório no 1º ciclo do Ensino Básico* (Master's thesis, Universidade do Minho, Instituto de Educação, Braga, Portugal).
- Miller, A. L., & Dumford, A. D. (2014). Creative cognitive processes in Higher Education. *The Journal of Creative Behaviour, 48*, 1-17. doi: 10.1002/jocb.77
- Morais, M. F., & Fleith, D. S. (2017). Conceito e avaliação da criatividade. In L. S. Almeida (Ed.), *Criatividade e pensamento crítico. Conceito, avaliação e desenvolvimento* (pp. 19-44). Braga, Portugal: Centro de Estudos e Recursos em Psicologia.
- Nakano, T. C. (2018). A criatividade pode ser medida? Reflexões sobre métodos utilizados e questões envolvidas. *Arquivos Brasileiros de Psicologia, 70*(1), 128-145. Retrieved from http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1809-52672018000100010&lng=pt&nrm=iso&tlng=pt
- Nehardani, H., Mormoosavi, S. Sani, A., Tabarraei, Y., & Ghodrati (2013). Studying the personal creativity barriers in the students of Sabzevar Medical Sciences University. *International Journal of Advanced Studies in Humanities and Social Science, 1*(10), 1566-1572. Retrieved from <http://ijashss.com/upload/IJASHSS-2013-%20SI-1007.pdf>
- Omdal, S., & Graefe, A. K. (2017). Investing in creativity in students: The long and short (term) of it. In J. A. Plucker (Ed.), *Creativity & innovation. Theory, research, and practice* (pp. 205-221). Waco, TX: Prufrock Press.
- Patston, T. J., Cropley, D., Marrone, R. L., & Kaufman, J. C. (2017). Teacher self-concepts of creativity: Meeting the challenges of the 21st century classroom. *The International Journal of Creativity & Problem Solving, 27*(2), 23-34. Retrieved from <http://go.galegroup.com/ps/anonymous?id=GALE%7CA533556209&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=22890408&p=AONE&sw=w>
- Richardson, C., & Mishra, P. (2018). Learning environments that support student creativity: Developing the SCALE. *Thinking Skills and Creativity, 27*(1), 45-54. doi: 10.1016/j.tsc.2017.11.004
- Romo, M. (2008). Creatividad en los dominios artísticos y científicos y sus correlatos educativos. In M. F. Morais & S. Bahia (Eds.), *Criatividade e educação: Conceitos, necessidades e intervenção* (pp. 65-90). Braga, Portugal: Psiquilíbrios.
- Runco, M. A. (2014). *Creativity: Theories and Themes: Research, Development and Practice*. San Diego, CA: Academic Press.
- Runco, M., & Jaeger, G. (2012). The standard definition of creativity. *Creativity Research Journal, 24*(1), 92-96. doi: 10.1080/10400419.2012.650092

- Russ, S. W., & Lee, A. W. (2017). Pretend play and creativity. In J. A. Plucker (Ed.), *Creativity and innovation-theory. Research and practice* (pp. 133-149). Waco, TX: Prufrock Press.
- Santos, F., & Fleith, D. S. (2015). Efeitos de um programa de criatividade para professoras em alunos do Ensino Fundamental. *Estudos de Psicologia* (Campinas), 32(4), 755-766. <http://dx.doi.org/10.1590/0103-166X2015000400018>
- Sierra, M. D., Escobedo, P. S., Cuervo, A. V., & Rosal, A. B. (2015). Estratégias e programas para o desenvolvimento da criatividade nas escolas do México. In M. F. Morais, L. C. Miranda, & S. M. Wechsler (Eds.), *Criatividade. Aplicações práticas em contextos internacionais* (pp. 257-268). São Paulo, SP: Vetor.
- Silva, T., & Nakano, T. (2012). Criatividade no contexto educacional: Análise de publicações periódicas e trabalhos de pós-graduação na área da psicologia. *Educação e Pesquisa*, 38(3), 743-759. doi: 10.1590/S1517-97022012005000013
- Soh, K. (2017). Fostering student creativity through teacher behaviors. *Thinking Skills and Creativity*, 23(1), 58-66. doi: 10.1016/j.tsc.2016.11.002
- Soulé, H., & Warrick, T. (2015). Defining 21st century readiness for all the students: What we know and how to get there. *Psychology of Aesthetics, Creativity and the Arts*, 9(2), 178-186. doi: 10.1037/aca0000017
- Starko, A. J. (2014). *Creativity in the classroom: Schools of curious delight*. New York: Routledge.
- Sternberg, R. (2015). Teaching for creativity: The sounds of silence. *Psychology of Aesthetics, Creativity and the Arts*, 9(2), 115-117. doi: 10.1037/aca0000007
- Tan, M., Mourges, C., Hein, S., MacCormick, J., Barbot, B., & Grikorenko, E. (2015). Differences in judgments of creativity: How do academic domain, personality and self-reported creativity influence novice judges' evaluations of creative production? *Journal of Intelligence*, 3(1), 73-90. doi: 10.3390/jintelligence3030073
- Vygotsky, L. S. (2004). Imagination and creativity in childhood. *Journal of Russian and East European Psychology*, 42(1), 7-97. Retrieved from http://lchc.ucsd.edu/mca/Mail/xmcamail.2007_08.dir/att-0149/LSV__1967_2004_.Imagination_and_creativity_in_childhood.pdf
- Wechsler, S., Oliveira, K. S., & Tonete-Suárez, J. (2015). Criatividade e saúde mental: Desenvolvendo as forças positivas do caráter. In M. F. Morais, S. M. Wechsler, & L. C. Miranda (Eds.), *Criatividade: Aplicações práticas em contextos internacionais* (pp. 59-76). São Paulo, SP: Vetor.
- Williams, R., Runco, M., & Berlow, E. (2016). Mapping the theme, impact, and cohesion of creativity research over the last 25 years. *Creativity Research Journal*, 28(4), 385-394. doi: 10.1080/10400419.2016.1230358

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