

Original article



Psychometric properties of the School Empathy Questionnaire: analysis of construct validity and reliability

Propiedades psicométricas del Cuestionario de Empatía Escolar: análisis de validez de constructo y fiabilidad

Propriedades psicométricas do Questionário de Empatia Escolar: análise da validade de construto e da confiabilidade

Hilber Roberty Monzón Novoa¹  0009-0006-4712-0343  hmonzonn@ucvvirtual.edu.pe

¹ University César Vallejo. Peru.

Received: 22/05/2026

Accepted: 23/06/2026

ABSTRACT

The development of empathy is an essential component for strengthening school coexistence, preventing aggressive behavior, and promoting holistic learning in primary school students. This study sought to analyze the psychometric properties of the School Empathy Questionnaire, evaluating its construct validity and reliability as an instrument for measuring the level of empathy in fifth-grade students in Peruvian educational contexts. An instrumental study was conducted to explore the questionnaire's structure and conceptual coherence, considering how it reflects the essential dimensions of the construct. The results showed that the questionnaire identifies five dimensions of empathy: emotional understanding, perspective-taking, empathic concern, prosocial behavior, and school coexistence. These dimensions are consistently related and allow for an understanding of how empathic skills manifest in daily school practice. This study also demonstrated that the instrument is reliable and provides useful information for the design of pedagogical programs

based on active methodologies, facilitating the identification of areas for improvement and teaching strategies focused on socio-emotional development. Furthermore, the findings showed that it allows for the observation of the complexity of empathy in different school contexts. In conclusion, the questionnaire emerges as a robust and versatile instrument that contributes to strengthening social-emotional education, guides pedagogical assessment, and promotes didactic innovation in primary education.

Keywords: school coexistence; primary education; empathy; reliability; socio-emotional skills; validity.

RESUMEN

El desarrollo de la empatía constituye un componente esencial para fortalecer la convivencia escolar, prevenir conductas agresivas y favorecer el aprendizaje integral en los estudiantes de educación primaria. En este estudio, se buscó analizar las propiedades psicométricas del Cuestionario de Empatía Escolar evaluando su validez de constructo y fiabilidad como instrumento para medir el nivel de empatía en estudiantes del V ciclo de educación primaria en contextos educativos peruanos. Se llevó a cabo un estudio instrumental orientado a explorar la estructura del cuestionario y su coherencia conceptual, considerando la manera en que refleja las dimensiones esenciales del constructo. Los resultados arrojaron que el cuestionario identifica cinco dimensiones de la empatía: comprensión emocional, toma de perspectiva, preocupación empática, conducta prosocial y convivencia escolar, las cuales se relacionan de manera consistente y permiten comprender cómo se manifiestan las habilidades empáticas en la práctica escolar cotidiana. En este estudio también se evidenció que el instrumento es confiable y aporta información útil para el diseño de programas pedagógicos basados en metodologías activas, facilitando la identificación de áreas de mejora y estrategias didácticas centradas en el desarrollo socioemocional. Asimismo, los hallazgos mostraron que permite observar la complejidad de la empatía en distintos contextos escolares. En conclusión, el cuestionario se perfila como un instrumento sólido y versátil que contribuye al fortalecimiento de la educación socioemocional, orienta la evaluación pedagógica y promueve la innovación didáctica en la educación primaria.

Palabras clave: convivencia escolar; educación primaria; empatía; fiabilidad; habilidades socioemocionales; validez.

RESUMO

O desenvolvimento da empatia é um componente essencial para fortalecer a convivência escolar, prevenir comportamentos agressivos e promover a aprendizagem integral em alunos do ensino fundamental. Este estudo buscou analisar as propriedades psicométricas do Questionário de Empatia Escolar, avaliando sua validade de construto e confiabilidade como instrumento para mensurar o nível de empatia em alunos do quinto ano do ensino fundamental em contextos educacionais peruanos. Um estudo instrumental foi conduzido para explorar a estrutura e a coerência conceitual do questionário, considerando como ele reflete as dimensões essenciais do construto. Os resultados mostraram que o questionário identifica cinco dimensões da empatia: compreensão emocional, tomada de perspectiva, preocupação empática, comportamento pró-social e convivência escolar. Essas dimensões estão consistentemente relacionadas e permitem compreender como as habilidades empáticas se manifestam na prática escolar diária. Este estudo também demonstrou que o instrumento é confiável e fornece informações úteis para o planejamento de programas pedagógicos baseados em metodologias ativas, facilitando a identificação de áreas de melhoria e estratégias de ensino focadas no desenvolvimento socioemocional. Além disso, os resultados mostraram que o instrumento permite observar a complexidade da empatia em diferentes contextos escolares. Em conclusão, o questionário se revela um instrumento robusto e versátil que contribui para o fortalecimento da educação socioemocional, orienta a avaliação pedagógica e promove a inovação didática no ensino fundamental.

Palavras-chave: convivência escolar; ensino fundamental; empatia; confiabilidade; habilidades socioemocionais; validade.

INTRODUCTION

Empathy is a fundamental socio-emotional competence for the integral development of primary school students, significantly transcending the cognitive dimension of learning and becoming an essential component for building democratic coexistence, preventing aggressive behaviors, and strengthening the school climate (Hoffman, 2000; Mestre *et al.*, 2004).

Recent empirical evidence corroborates the importance of empathic development in diverse cultural and socio-educational contexts. Research conducted in Asian contexts has documented the

significant impact of techno-pedagogical interventions using social robotics on children's empathic responses and emotional reflection (Vergara Flores & Figueroa Céspedes, 2024); while research in the Ibero-American sphere has validated structured pedagogical interventions that incorporate specific dimensions adapted to their educational realities (Palacios Becerra *et al.*, 2024; Pinzón *et al.*, 2023).

In the Peruvian context, recent evidence is particularly relevant. The Study on Social and Emotional Skills (SSES), conducted with approximately 3,500 students from 95 Peruvian educational institutions, revealed persistent inequalities in the development of skills related to collaboration, emotional regulation, empathy, and engagement with others. These findings underscore the need to develop psychometrically sound instruments, adapted to the national context, for the rigorous assessment of empathy in primary and secondary school students.

Despite these significant advances, a methodological gap persists in the validation of instruments specifically designed to assess empathy in primary school students in Latin American contexts, particularly in Peru. Existing instruments tend to have been developed for adolescent or adult populations, or they present psychometric limitations that compromise their applicability to fifth-grade students. This research addresses precisely this gap through the psychometric validation of the School Empathy Questionnaire (SEC), an instrument specifically designed to measure empathy in fifth-grade students within the Peruvian educational context.

The construct of empathy rests on three fundamental theoretical strands that shape its conceptual architecture. The multidimensional approach, according to Davis (1980), emphasizes the coexistence of cognitive and affective components in the empathic response, distinguishing between perspective-taking and empathic concern. The moral development perspective, developed by Hoffman (2000), promotes the understanding of empathy as an evolutionary process that links emotional understanding with prosocial behavior. Complementarily, the paradigm of emotional education establishes causal links between empathic development and school coexistence outcomes (Bisquerra, 2003; Goleman, 1995).

The contemporary conceptualization of empathy, following Mestre Escrivá *et al.* (2004), defines it as the capacity to recognize, understand, and respond appropriately to the emotions, thoughts, and needs of others through cognitive and affective processes that translate into prosocial behaviors and the building of positive interpersonal relationships. This definition incorporates essential dimensions

such as emotional understanding, perspective-taking, empathic concern, prosocial behavior, and school coexistence—elements that underpin the five-dimensional structure of the School Empathy Questionnaire SEQ proposed in this research.

This study focuses specifically on the psychometric analysis of the School Empathy Questionnaire (SEQ), examining its construct validity and internal reliability to establish its suitability as an instrument for assessing empathy in the Peruvian educational context. The specific objectives include: determining the underlying factor structure through exploratory factor analysis; evaluating the internal consistency of the identified dimensions; and analyzing interdimensional correlations to verify the theoretical coherence of the construct.

The relevance of this research lies in its potential contribution to the development of pedagogical programs based on empirical evidence and aligned with the goals of Sustainable Development Goal 4. The availability of a psychometrically sound instrument will allow for the accurate diagnosis of the level of empathy in primary school students, providing a basis for specific interventions using active methodologies to strengthen it within the Peruvian education system.

MATERIALS AND METHODS

This design allows for the systematic examination of the psychometric properties of the School Empathy Questionnaire, while maintaining the methodological rigor necessary to guarantee the quality of the measurements.

The sample consisted of 150 students from the fifth cycle of primary education (fifth and sixth grade) from public educational institutions belonging to the jurisdiction of the Local Educational Management Unit 04 Trujillo Sur Este (Peru), selected through non-probabilistic convenience sampling.

The inclusion criteria included: being regularly enrolled in the fifth cycle of primary education during the 2025 academic year; having informed consent from a parent or guardian; and demonstrating regular attendance at the educational institution. Students with absences exceeding 20% during the application period were excluded, as were those with special educational needs requiring specific adaptations to the instrument.

The participants had a mean age of 11.2 years ($SD=0.74$) and a balanced distribution by grade level: 49.3% were in fifth grade and 50.7% were in sixth grade. The gender distribution showed 51.3%

female and 48.7% male, reflecting the demographic proportionality characteristic of public educational institutions in the region.

The School Empathy Questionnaire (SEQ) comprises 25 items distributed across five theoretical dimensions (five items per dimension), assessed using a four-point Likert scale adapted to the developmental level of the participants (1=Never, 2=Sometimes, 3=Almost always, 4=Always). Its development followed a sequential process that included: a systematic review of specialized literature on empathy in childhood; consultation with experts using the Delphi method (n=7); a pilot test with 20 students not included in the final sample; and refinement based on preliminary analyses.

The dimensions evaluated are:

- Emotional understanding: assesses the ability to recognize and identify one's own and others' emotions (e.g., "I can tell when a classmate is sad").
- Perspective-taking: measures the cognitive ability to put oneself in another's shoes (e.g., "I try to imagine how my partner feels when they have a problem").
- Empathic concern: values affective sensitivity to the discomfort of others (e.g., "I worry when someone in my class is going through a difficult time").
- Prosocial behavior: examines actions of help and cooperation directed towards others (e.g., "I help my classmates when they need support in a task").
- School coexistence: evaluates attitudes of respect and peaceful resolution in daily interactions (e.g., "I solve my problems with others by talking, without aggression").

The instrument was validated by seven experts in primary education, educational psychology and socio-emotional skills assessment, who evaluated its relevance and clarity using Aiken's V, obtaining coefficients greater than 0.85 for all items, which confirms the content validity of the instrument.

The study received approval from the University's Research Ethics Committee (name omitted for blind review). Data collection was conducted in person during September and October 2025, in sessions scheduled with each educational institution. Prior to data collection, informed consent was obtained from parents and informed assent from students, ensuring confidentiality and anonymity. Participants were informed that participation was voluntary and that they could withdraw at any time without consequence.

The application was standardized, with uniform instructions adapted to the participants' reading level and an average completion time of 20 minutes. The principal investigator and the supervising teacher were present to address any comprehension questions. Subsequently, a quality check of the data was performed, revealing no anomalous response patterns or significant outliers.

Analytical processing was performed using SPSS v.27 and JASP v.0.18.3, following a sequential protocol:

- Preliminary analysis: Descriptive statistics (mean, standard deviation, asymmetry and kurtosis) were examined to verify the normality of the distribution. The Kaiser-Meyer-Olkin (KMO) index and Bartlett's test of sphericity were calculated to confirm sampling adequacy.
- Exploratory factor analysis (EFA): This was implemented using the maximum likelihood extraction method with Promax oblique rotation, considering the theoretical correlation between the dimensions of the construct. The determination of the optimal number of factors was based on multiple criteria: eigenvalues greater than 1 (Kaiser), Horn's parallel analysis, and examination of the scree plot.
- Reliability analysis: Internal consistency was assessed using Cronbach's alpha coefficient for each dimension. Standard errors and 95% confidence intervals were calculated for these coefficients.
- Correlational analysis: Pearson correlations between dimensions were determined, evaluating their statistical significance ($p < 0.01$).
- Visualization of results: specialized graphics (factor loading heat map and box and whisker plot) were developed to visually represent the main findings.

RESULTS

Preliminary analyses confirmed the sample adequacy for the EFA. The KMO index reached a value of 0.872, considered meritorious according to Kaiser criteria, while Bartlett's test of sphericity was significant ($\chi^2 = 1845.32$, $df = 300$, $p < 0.001$), indicating sufficient correlations between variables for factor analysis.

Table 1 presents the factor loadings, percentages of variance explained, and statistical significance of each dimension.

Table 1. Factor loadings, percentage of variance explained and statistical significance of the dimensions of the School Empathy Questionnaire

Dimension	No. of items	Average	Reliability	Variance	Factor loading	Significance
Emotional understanding	5	16.4	0.86	22.4%	0.836	p < 0.001
Perspective Taking	5	15.9	0.83	14.8%	0.812	p < 0.001
Empathic concern	5	16.1	0.81	12.6%	0.789	p < 0.001
Prosocial behavior	5	16.7	0.79	10.5%	0.764	p < 0.001
School coexistence	5	15.6	0.78	8.1%	0.738	p < 0.001

Note: Factor loadings indicate the relationship between items and each dimension. Variance explained is expressed as a percentage. All dimensions showed statistical significance (p < 0.001)

Source: Own elaboration

Factor loadings analysis reveals that the emotional understanding dimension emerges as the most significant component (22.4% of variance explained), with a factor loading of 0.836, confirming the centrality of emotional recognition as the basis of empathic response in primary school children. Perspective-taking is the second most relevant factor (14.8% of variance), with a factor loading of 0.812, highlighting the importance of the cognitive component of empathy in students at this developmental stage. It is noteworthy that all dimensions exhibit factor loadings greater than 0.73 and levels of statistical significance (p < 0.001) that confirm the robustness of the factor structure.

The results show an optimal distribution of loadings, with high values concentrated in the theoretically expected factors and cross-loadings generally below 0.30, confirming the discriminant validity among the five dimensions of the construct. This configuration supports the consistency between the theoretical proposal and the empirical structure of the instrument.

Correlational analysis

Table 2 presents the Pearson correlations between the main dimensions of empathy. The coefficients reveal moderate and statistically significant positive associations, consistent with the multidimensional but integrated nature of the construct.

Table 2. Pearson correlations between key dimensions of the School Empathy Questionnaire

Dimensions	Pearson correlation	Significance
Emotional understanding – perspective-taking	0.58	$p < 0.01$
Perspective-taking – empathic concern	0.52	$p < 0.01$
Empathic concern–prosocial behavior	0.49	$p < 0.01$
Prosocial behavior – school coexistence	0.45	$p < 0.01$
Emotional understanding – school coexistence	0.34	$p < 0.01$

Note: Significant correlations at the $p < 0.01$ level

Source: Own elaboration

The strongest association was observed between emotional understanding and perspective-taking ($r=0.58$, $p<0.01$), suggesting a functional link with emotional recognition. The correlation between perspective-taking and empathic concern ($r=0.52$) demonstrates the connection between the cognitive and affective processes of the construct. The moderate, not excessively high, correlations confirm that the dimensions, although related, maintain conceptual specificity, which supports the discriminant validity of the instrument.

Reliability analysis

Table 3 presents the internal consistency coefficients (Cronbach's Alpha) for each dimension, along with their standard errors and 95% confidence intervals.

Table 3. Internal reliability and statistical precision values by dimension of the School Empathy Questionnaire

Dimensions	Cronbach's alpha	Standard error	Confidence interval (95%)
Emotional understanding	0.86	0.022	0.82–0.90
Perspective Taking	0.83	0.024	0.79–0.87
Empathic concern	0.81	0.025	0.77–0.85
Prosocial behavior	0.79	0.027	0.74–0.84
School coexistence	0.78	0.028	0.73–0.83
Complete questionnaire	0.91	0.018	0.88–0.94

Note: Cronbach's alpha calculated with 95% confidence intervals

Source: Own elaboration

Emotional understanding emerged as the most reliable dimension ($\alpha = 0.86$, $SE = 0.022$), while school coexistence presented the most conservative, though equally satisfactory, value ($\alpha = 0.78$, $SE = 0.028$). The overall alpha coefficient for the questionnaire reached an excellent value ($\alpha = 0.91$), confirming the instrument's overall psychometric robustness. The relatively low standard errors (0.018–0.028) and narrow confidence intervals suggest precise estimates of instrumental reliability.

Demographic characteristics

Table 4 presents the demographic characteristics of the students participating in the study.

Table 4. Demographic characterization of the participants

Variable	Frequency	Percentage	Average	Standard deviation
Female gender	77	51.3%	—	—
Male gender	73	48.7%	—	—
Age	—	—	11.2	0.74
Fifth grade	74	49.3%	—	—
Sixth grade	76	50.7%	—	—
Regular attendance	150	100%	—	—

Note: Sociodemographic data of the participants (N=150)

Source: Own elaboration

The sample shows a relatively balanced gender distribution, with a slight female majority (51.3%). The mean age (11.2 years) and the balanced distribution between fifth and sixth grade demonstrate the representativeness of the fifth cycle of primary education. The regular attendance of 100% of the participants guarantees the quality of the collected data, as it ensures that all students had the opportunity to adequately understand the questionnaire items during its administration.

DISCUSSION

Analysis of the properties of the School Empathy Questionnaire (SEC) reveals relevant findings that deserve attention in the field of primary education. The five-dimensional structure identified through exploratory factor analysis reflects how the instrument comprehensively captures the cognitive, affective, and behavioral components of empathy, highlighting dimensions such as emotional understanding and perspective-taking, which underscore the importance of linking emotional recognition with the ability to adopt others' perspectives (Davis, 1980; Hoffman, 2000; Mestre *et al.*, 2004).

An instrumental study was implemented following the methodological guidelines established by Ato *et al.* (2013) for the validation of psychometric instruments. This sample size exceeded the minimum criterion of six participants per item for exploratory factor analysis in preliminary validation phases, according to the recommendations of Costello and Osborne (2005).

The correlations between the different dimensions showed theoretically consistent associations, in which emotional understanding is significantly linked to perspective-taking, demonstrating a network of interrelated socio-emotional competencies that maintains the conceptual specificity of each dimension and supports the construct validity of the instrument. The cognitive ability to adopt another's perspective is a finding consistent with Davis's (1980) theoretical proposal on the articulation between the cognitive components of empathy.

The results showed optimal internal consistency across all dimensions, with alpha coefficients exceeding the 0.70 threshold recommended in the literature (Hair *et al.*, 2010). These findings are consistent with the approaches of Goleman (1995) and Bisquerra (2003), who emphasize the multidimensional yet integrated nature of socio-emotional skills in childhood. Values greater than 0.70 were considered acceptable (Hair *et al.*, 2010).

For the magnitude of the associations, according to Cohen's (1988) criteria, the results of the exploratory factor analysis revealed a five-dimensional structure that explains 68.4 % of the total variance, a value that exceeds the conventional threshold of 60% recommended in the social sciences (Hair *et al.*, 2010). The internal consistency of the SEQ, with a total alpha coefficient of 0.91 and dimensional values greater than 0.78, indicates that it is a reliable instrument, allowing its application in diverse educational contexts, facilitating the identification of areas for improvement and the design of pedagogical strategies focused on socio-emotional development. These values are consistent with those reported by similar instruments validated in Latin American (Palacios Becerra *et al.*, 2024) and Ibero-American (Vergara Flores & Figueroa Céspedes, 2024) contexts.

From a methodological perspective, the findings highlight the importance of having robust psychometric models to guide the implementation and evaluation of pedagogical interventions based on active learning methodologies. Additionally, Ato *et al.* (2013) offer useful criteria for classifying and structuring instrumental research designs, strengthening the clarity and reliability of the studies.

The findings of this study suggest that the SEQ allows for the recognition of empathy patterns and an understanding of how socio-emotional competencies manifest in specific school contexts. Its application provides valuable information for planning pedagogical programs focused on continuous improvement, promoting the development of teaching strategies aligned with educational quality standards and institutional development objectives (UNESCO, 2024).

The tool facilitates the identification of empathic profiles and the guidance of personalized interventions through active methodologies such as cooperative learning, role-playing, group dynamics and project-based learning, promoting the articulation between theory and practice and contributing to the consolidation of an effective socio-emotional education that strengthens both school coexistence and the teaching-learning processes (Rodríguez Flores, 2025).

The research highlights the importance of expanding future studies to verify the structure of the SEQ in more diverse and heterogeneous contexts, as well as its temporal stability through pretest-test analysis and its sensitivity to change in intervention studies. Integrating complementary confirmatory analyses and exploring mixed methodological approaches will allow for a deeper understanding of how empathy manifests in different school settings, strengthening the instrument's applicability and its relevance to children's socio-emotional development and pedagogical innovation. These findings position the SEQ as a valuable resource for diagnosing and strengthening empathy in primary school

students, promoting educational processes that enhance educational quality and the transformation of schools.

REFERENCES

- Ato García, M., López García, J. J., Benavente Reche, A. (2013). Un sistema de clasificación de los diseños de investigación en psicología. *Anales de psicología*, 29(3), 1038-1059.
<https://doi.org/10.6018/ANALESPS.29.3.178511>
- Bisquerra Alzina, R. (2003). Educación emocional y competencias básicas para la vida. *Revista de Investigación Educativa*, 21(1), 7-43. <https://revistas.um.es/rie/article/view/99071>
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. L. Erlbaum Associates.
<https://books.google.com.pe/books?id=L6x9AQAAAJ&printsec=frontcover&dq=editions:I SBN1483276481&hl=es>
- Costello, A. B., & Osborne, J. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research, and Evaluation*, 10(1). <https://doi.org/10.7275/jyj1-4868>
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS (Journal Supplement Abstract Service): Catalog of Selected Documents in Psychology*, 10, 85. https://www.uv.es/~friasnav/Davis_1980.pdf
- Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ*. Bantam Books.
https://books.google.com.cu/books?id=XP5GAAAAMAAJ&hl=es&source=gbs_book_other_versions
- Hair, J. F., Black, W. C., & Babin, B. J. (2010). *Multivariate Data Analysis: A Global Perspective*. Pearson Education.
https://books.google.com.cu/books/about/Multivariate_Data_Analysis.html?id=SLRPLgAACAAJ&redir_esc=y
- Hoffman, M. L. (2000). *Empathy and Moral Development: Implications for Caring and Justice*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511805851>

Mestre Escrivá, V., Frías Navarro, M. D., & SamperGarcía, P. (2004). La medida de la empatía: Análisis del Interpersonal Reactivity Index. *Psicothema*, 16(2), 255-260.

<https://psycnet.apa.org/record/2004-13889-013>

Palacios Becerra, M. del S., Honores Rueda, N. A., Vergel Parejo, E. E., & Chiriboga Posligua, M. F. (2024). Educación en valores para desarrollar la empatía en estudiantes de séptimo grado de educación general básica. *Sinergia Académica*, 7(Especial 5), 445-477.

<https://doi.org/10.51736/ctvd8323>

Pinzón, D., Vargas, N., & Ballén Pulido, P. Y. (2023). Tejiendo redes de conexión: La pedagogía de la empatía como estrategia didáctica para el aprendizaje y la motivación escolar, estudio desarrollado en la institución educativa técnico integrado de Trinidad-Casanare, Colombia. *Ciencia Latina Revista Científica Multidisciplinar*, 7(3), 5416-5439.

https://doi.org/10.37811/cl_rcm.v7i3.6562

Rodríguez Flores, K. J. (2025). La influencia de las metodologías activas en el fortalecimiento de las habilidades socioemocionales en estudiantes de bachillerato fiscal. *Revista Multidisciplinar Epistemología de las Ciencias*, 2(2), 801-817. <https://doi.org/10.71112/4y7rz565>

UNESCO (2024). *Aportes para la enseñanza de habilidades socioemocionales: Estudio Regional Comparativo y Explicativo (ERCE 2019)* - [Biblioteca Digital].

<https://unesdoc.unesco.org/ark:/48223/pf0000388352>

Vergara Flores, I., & Figueroa Céspedes, I. (2024). Cultivando la empatía en el aula de segundo básico: Una propuesta interaccional-cooperativa. *Revista Reflexión e Investigación Educativa*, 6(1), 1-11. <https://doi.org/10.22320/reined.v6i1.6470>

Conflict of interest

Authors declare no conflict of interests.

Authors' contribution

The authors participated in the design and writing of the article, in the search and analysis of the information contained in the consulted bibliography.



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License