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Inductive- and Deductive-Inspired Photovoice Use in Higher Education: Academic Performance, Satisfaction and Self-Efficacy

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Abstract

This study focuses on the use of photovoice (PV) as a pedagogical technique in university classrooms, specifically in social sciences. It aims to provide scientific evidence for the use of PV as an active methodology that promotes participation, the development of critical thinking and the understanding of theoretical concepts. However, there is still very little evidence to suggest how this methodology is most appropriately used. This exploratory study compares inductive and deductive PV, utilizing the variables of academic performance, perceived self-efficacy and satisfaction with the performed activity. A total of 254 students participated in the study, 128 of whom performed the deductive PV activity and 126 of whom performed the inductive one. The results demonstrate that the inductive approach more positively influences student learning; therefore, it is considered a good learning methodology that improves their understanding of theoretical concepts. It helps students to critically analyze their surrounding reality.

Keywords: photovoice; self-efficacy; satisfaction



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1. Introduction

1.1. Photovoice (PV) in Higher Education: Pedagogical Potential and Applications

Photovoice (PV) originated as a participatory research method and is understood as a cooperative process between researchers and participants who are both actively involved in it, and therefore, in knowledge co-creation (Haffejee, 2021). The methodology is based on the pedagogy of Paulo Freire (1970). A number of pioneering studies highlight the method's ability to reveal social situations within communities by expressing one's point of view and not that of somebody alien to these realities (Wang et al., 1996). PV allows critical dialog and action to emerge via discussing photographs (Hernández et al., 2014), and it also encourages the participation of traditionally marginalized groups (González, 2016). Several research works have also echoed the usefulness of photography as a technique for social intervention, particularly in social sciences, the discipline on which our study focuses (Bonetto, 2016; Echeverry Forero & Herrera Pineda, 2005; Vega et al., 2018; Oden, 2013). The existing literature provides practical examples of how it has been used in numerous contexts, including the mental health field (Romea et al., 2022), with sex workers (Desyllas, 2014) and particularly in linking social work and social justice (Peabody, 2013; Molloy, 2007).

Despite its usefulness, especially in the social field, very few publications have focused on how to incorporate this technique as a pedagogical resource in social sciences learning in higher education, and how to train future professionals to apply it in their work (Jarldorn, 2018; Mulder & Dull, 2014; Malka & Lotan, 2023). As we see later, this lack of knowledge

is because PV has historically emerged as an active and participatory research technique rather than as a pedagogical one. Thus, we intend to contribute to the pedagogical corpus of its inclusion in higher education in the Spanish context, which needs to be represented in analyses of the use of this technique.

The PV methodology is gradually gaining relevance in the teaching–learning (T-L) process in higher education (Cho et al., 2021; Cooper et al., 2017; Cornell & Kessi, 2017; Coronado et al., 2020; Haffejee, 2021; Hernández et al., 2014; Schell et al., 2009; Musanti & dos Santos, 2020; Trout et al., 2019; Zeglin et al., 2019; Peterson & Lundquist, 2021) due to, among other reasons, the fact that a student-centered T-L model is being increasingly advocated as opposed to the model of knowledge transmission from teachers. For this reason, active learning methodologies, which follow a competency-based model, now play a more significant role in classrooms. One of these methodologies, the flipped classroom or case study, has been broadly shown as being effective in science, health sciences and social sciences teaching (Baepler et al., 2014; Chen et al., 2017; Njie-Carr et al., 2017; Presti, 2016; Albert & Beatty, 2014; Roach, 2014; Gómez-Poyato et al., 2020; Holmes et al., 2015; Oliván Blázquez et al., 2019; Sage & Sele, 2015). Hence, we seek to integrate PV as a pedagogical resource into university classrooms, initially designed to combine photography with participation and social intervention (Casals & Calvo, 2022).

Similarly, to all researchers who work in this field, we herein question the best way to use PV in social sciences classrooms, specifically in social work, anthropology, sociology and social psychology. In this study, we consider whether the technique works better when used inductively or deductively. As there is no specific literature that deals with these two aspects in higher education teaching, this article aims to provide new perspectives in this discipline.

On the one hand, a deductive approach, based on teachers' initial selections of images, allows students to understand different theoretical concepts. In this approach, we start by taking photographs from a general perspective as elements from which to deduce theoretical concepts through reflection on these images. On the other hand, an inductive approach uses specific and well-defined theoretical concepts so that students can take or search for images on the internet. Preferably, this can be performed by students themselves taking images with which to explain these concepts and to demonstrate that they have been understood. This inductive analysis implies that different images are generated based on students' understanding of concepts. In this way, the dividing line between deductive and inductive approaches is represented by the closed images selected by teachers in the deductive approach and the more open and diverse images taken by students in the inductive approach. Both methods have been implemented in teaching for a bachelor's degree in social work program to assess their effectiveness in relation to certain items, i.e., critical thinking development, reflection and internalization of new theoretical knowledge. We are aware that PV projects have been established based on processes that focus on emancipation and participatory action research. In this study, we are inspired by them in treating photography as an element of learning and reflection. The selection of both methods is based on the objective of providing scientific evidence for their application in classrooms as a basis for improving PV activities carried out in our future teaching practice.

Visual language has its own characteristics, and transmits information just like writing does; therefore, we assume that photography is much more than a selection of images that decorate written texts. In this study, we focus on audiovisual anthropology and sociology since the mid-twentieth century (Bateson & Mead, 1942; Barthes, 1980; Bourdieu, 1989; Banks & Morphy, 1997; Collier & Collier, 1986), which have dealt with images as cultural phenomena, methodological tools and sources for reflection on various socio-cultural issues. For example, we are inspired by reflections like those of Collier and Collier (1986), who

emphasize the use of images during the research process as a way to establish bridges of communication and engage in dialog through a medium that facilitates intercultural communication. We also draw on pioneering action research projects, such as those of Wang, Burris and Yue Ping, and their technique called photo novella (Wang et al., 1996), and Pink (2008) and her collaborative strategies in research with images. Based on these references, we also choose to work with photography as a tool that encourages participation, a critical spirit and the understanding of socio-cultural phenomena. In social science disciplines, these issues are vital for students' training in their future professional roles.

This existing literature helps us to lay the theoretical foundations for our study, positioning PV as an opportunity to encourage student participation and make the theoretical concepts that we wish to transmit to students more understandable. We also seek to increase satisfaction and autonomy in learning based on previous teaching experiences in higher education, where PV has been used. Regarding its application in higher education, we have found literature that clearly demonstrates the potential of PV in higher education classrooms across different degree programs. For example, the systematic review of Muñoz Rodríguez et al. (2022) analyzes 15 articles in high-impact journals about PV use in higher education, for different university degrees and with distinct techniques and objectives. The aim of these studies is to analyze the suitability of an adaptation of PV in the development of reflection and critical thinking, establishing images as bridges of communication that foster dialog in the classroom based on PV use in social research. Of these 15 texts, the research by Ferrer-Aracil et al. (2021) analyzes PV within the framework of a mandatory subject in a social work degree, and shares the same educational framework as our study. In this case, the authors obtain a favorable and medium–high evaluation result for the different aspects studied in these articles, including satisfaction with project organization and the methodology used to facilitate understanding of subject content. Furthermore, in Mulder and Dull (2014), these tools are also applied to social work students to encourage the development of visual expression, personal reflection and dialog in the classroom, and thus, facilitate interpersonal and intrapersonal change in students.

Furthermore, other articles emphasize the critical, cohesive and creative nature of PV when dealing with social issues in higher education, such as migration, inequality, disability and ecology (Haffee, 2021; Oden, 2013; Montoya et al., 2020; Coronado et al., 2020; Kroeger et al., 2012; Shefer et al., 2018; Haffee, 2021) concludes that the PV methodology represents significant student learning by improving their knowledge and skills in health disciplines in higher education. Kroeger et al. (2012) conclude that this participatory methodology benefits both education degree students, to which it has been applied, and future pupils. Oden (2013) put PV into practice with a group of 20 social work students, and the project culminated with an event in a gallery, which was open to the community, to discuss the photographs taken around selected topics in small groups. The author concluded that the experience was a complete success in promoting knowledge of the chosen topics and raising awareness in future social workers about issues of vital importance to their profession.

The effectiveness of PV in higher education is closely linked to several interrelated factors that influence students' learning outcomes. Participation in PV requires students to engage in critical reflection, creative decision-making and the application of theoretical concepts to visual representations. In this context, self-efficacy—students' beliefs in their ability to successfully perform these tasks—is a crucial determinant of engagement, motivation and the depth of learning. High self-efficacy can enable students to approach PV activities with confidence, fostering greater exploration, problem-solving and reflective thinking, while low self-efficacy may limit participation and critical engagement.

Linking PV with the variable of self-efficacy allows educators to evaluate the different strategies used in the classroom and their impact on students' learning processes. Under-

standing this relationship represents a novel approach; therefore, we will next explore the concept of self-efficacy and its connection to PV.

1.2. Self-Efficacy, PV and Agency in Higher Education

In higher education, the construct of self-efficacy provides a central framework for understanding student engagement, motivation and performance in innovative learning methodologies, such as PV. According to [Bandura \(1977\)](#), perceived self-efficacy refers to “personal judgments of one’s capabilities to organize and execute courses of action to attain designated types of educational performances” (p. 191). These beliefs are not merely reflections of actual ability; they actively shape how students approach tasks, persevere in the face of challenges, set goals and regulate their learning strategies ([Pintrich & De Groot, 1990](#); [Schunk, 2003](#); [Zimmerman et al., 1992](#)). In educational contexts, self-efficacy has been consistently identified as a key predictor of academic achievement, influencing both cognitive and motivational dimensions of learning ([Bandura, 1997](#); [Pajares, 1996](#); [Zhang, 2025](#); [Honicke & Broadbent, 2016](#)). Strong beliefs in one’s capabilities facilitate engagement in self-regulated learning, enabling students to plan, monitor and adapt their learning processes more effectively ([Zimmerman, 2000](#)).

PV represents an innovative and creative pedagogical methodology that integrates visual expression with critical reflection. In PV, students are invited to analyze social realities and construct knowledge by taking or interpreting photographs, linking personal or collective experiences to theoretical concepts. Participation in PV requires active decision-making, interpretation and synthesis, which makes students’ perceived self-efficacy a crucial factor in determining the depth of their engagement and learning outcomes. Research on participatory visual methods shows that PV can enhance empowerment, reflective thinking and engagement ([Tan et al., 2024](#); [Packard, 2008](#); [Wang & Burris, 1997](#)). For instance, a student confident in their ability to analyze complex social phenomena and visually represent them is likely to engage more meaningfully with both the activity and the underlying theoretical frameworks. Conversely, low self-efficacy may limit exploration, reflection and creative problem-solving, constraining the potential benefits of PV.

A key concept closely related to self-efficacy is agency, defined as the capacity of individuals to act intentionally, make choices and reflect upon the consequences of their actions ([Bandura, 2001, 2006](#)). Agency is particularly relevant in educational settings because it manifests as students’ autonomy, initiative and ownership of learning. Studies in higher education emphasize that agency develops through pedagogical practices that promote decision-making, autonomy and reflective inquiry ([Biesta & Tedder, 2007](#); [Mameli et al., 2023](#)). In the context of PV, agency is expressed when students actively select subjects for their photographs, decide on interpretive approaches and critically reflect on the social and theoretical implications of their work. This alignment between self-efficacy and agency suggests that fostering students’ confidence in their capabilities simultaneously strengthens their capacity to act as proactive, self-directed learners. PV, therefore, functions not only as a pedagogical tool, but also as a transformative space in which learners can develop critical thinking, creativity and empowerment, as we discussed in the previous section.

Although self-efficacy has been extensively studied in higher education across various methodologies, including case studies, experimental designs and mixed-methods research ([Bi et al., 2019](#); [Keshmiri et al., 2021](#); [Ramos-Villagrana et al., 2018](#); [Zhu et al., 2021](#)), its role in PV has received limited attention. Previous studies have highlighted self-efficacy as a predictor of academic performance in traditional and innovative learning activities, particularly when tasks require problem-solving, self-regulation or creative engagement ([Bandura, 1994](#); [Schunk & Pajares, 2001](#)). However, PV introduces unique challenges and opportunities, blending visual literacy, critical reflection and theoretical analysis.

Understanding how students' self-efficacy influences their participation in PV activities can inform pedagogical strategies and guide the selection of instructional approaches that maximize engagement and learning outcomes.

In short, in this article, we wish to examine the application of PV in both inductive and deductive approaches, focusing on its relationship with students' self-efficacy, satisfaction and academic performance. By exploring these dimensions, we seek to provide new insights into how PV can be effectively implemented in social work education and other social science disciplines. Our research emphasizes the importance of aligning pedagogical design with students' confidence and perceived capabilities, thereby fostering both academic achievement and the development of agency. Ultimately, this study contributes to a deeper understanding of how creative, reflective methodologies like PV can enhance student learning, motivation and participation in higher education contexts.

The research question, therefore, is as follows: which of the two PV methodologies, inductive or deductive, is more significantly associated with a higher academic performance and greater satisfaction and is directly correlated with self-efficacy?

The proposed hypotheses are that both methodologies lead to good academic results, with the deductive approach yielding superior performance, and that both also produce high levels of satisfaction, although they are higher in the inductive approach. High academic performance is expected to be associated with a strong sense of self-efficacy.

2. Materials and Methods

2.1. Design

We conducted a quasi-experimental study with 254 students enrolled in various subjects across different years of the social work degree program at the University of Zaragoza (Spain). They participated in a PV activity following either an inductive or a deductive methodology between February and May 2023. In all of them, the objective was to improve their understanding of theoretical concepts and their application to the proposed practice. Teachers performed different activities in each subject while bearing in mind the above-mentioned inductive and deductive approaches.

The social work degree at the University of Zaragoza consists of 240 ECTS credits over 4 years. Each student attends four teaching hours per week per subject taken at the school: two hours in classes on theoretical content and two hours carrying out practical activities related to theoretical content. These learning activities were performed during the practical sessions of the following courses: social anthropology (degree year 1); social work with groups (year 2); health, dependence and social vulnerability (also year 2) and social work in the mediation field (optional subject in years 3 and 4). All the subjects used for this study were required for the social work degree, except for the mediation course. We utilized an ad hoc questionnaire to assess students' satisfaction with the activity, and the teaching staff for each subject evaluated students' work based on the theoretical and practical contents that they were required to cover.

2.2. Participants and Sample Size

The participants were students enrolled in the above-mentioned courses during the second semester of academic year 2022–2023 who attended at least 80% of classes. The sample size was 254 students: 103 from the social anthropology course, 97 from the social work with groups course, 21 from the health, dependence and social vulnerability course and 33 from the social work in the mediation field course.

As previously mentioned, we did not find any studies that analyze a combination of the proposed methodologies using quantitative and quasi-experimental designs. However, we relied on the study of [Oliván-Blázquez et al. \(2023\)](#) to calculate sample size, because the

objective of that study was to compare two learning methodologies in two student groups using academic performance as the main variable (from 0 to 10). The study showed a significant difference of 1.01 points between both methodologies. Therefore, by considering the study data, assuming a 5% error, 95% probability of success, a 95% confidence interval and 5% precision, and by adding 10% for potential withdrawal of participants from the study or missing data, at least 166 students were needed (83 in each learning group). A group of 254 students ultimately participated in this study, which exceeded the necessary sample size. Although it may be considered a convenience sample, the achieved sample size represents more than 50% of the students enrolled in the social work course, including the students from both the morning and afternoon shifts. Therefore, the sample representativeness is not considered to be compromised. Regarding the numbers of students, 126 performed the inductive PV activity and 128 performed the deductive PV activity. There was no sample randomization for both activities because students were assigned to either the inductive or the deductive PV activity by subject.

The PASS software [Version 14; PASS 14 Power Analysis and Sample Size Software (2016) NCSS, LLC, Kaysville, UT, USA, [<https://www.ncss.com/software/pass/>]] was used to calculate the sample size (accessed on 10 January 2024).

2.3. Performed Learning Activities

The PV activities took place during 2 h classes in all four courses involved in our research, with the two deductive and two inductive activities listed below.

In the social work with groups subject, in the part linked with the social psychology area, the subject's teacher provided eight photographs showing groups of people. Students had to identify the groups that appeared in the photos and classify them according to the concepts and classification of the groups seen during the theoretical class to follow a deductive methodology. This activity was performed as a group by working in mini-groups and then moving on to debate in a large group.

In the social work in the mediation field course, the teacher applied the PV deductive approach at two time points. In the first, the chosen photograph was shown to the general group for individual reflection, and in the second, to create an image's description from the work performed by subgroups.

In the health, dependence and vulnerability subject, the activity consisted of searching or taking four photographs that portrayed the contents of four sociological theories of health (functionalism, social constructivism, labeling theory and social conflict) and the topic of unequal access to healthcare via an inductive approach. In addition, students had to prepare a short text that explained the choice of images and then present it in class.

In the social anthropology course, the focus was on transmitting concepts of racism and cultural appropriation during a single session, both of which are central to the contents of this subject. Student groups were formed with between three and five people to carry out the activity, and their members had 1 week to photograph the suggested questions using the inductive approach. On the practical day, they showed their results to the class by organizing the images into a presentation and explaining the theoretical concepts to which they were related.

2.4. Variables and Instruments

The main variable in this study was students' academic performance, which was evaluated according to the grade obtained in PV activity with a rating from 0 to 10, where a higher score indicates better performance. The teacher determined grades based on the achievement of the objectives set out in relation to the given task, with a qualitative assessment of fail (0–4.99), pass (5–6.99), noteworthy (7–8.99) and excellent (9–10). The

secondary variables were students' satisfaction with the activity and self-efficacy in relation to task performance.

We collected the student satisfaction data with the performed activity using a self-administered questionnaire composed of seven statements (Gómez-Poyato et al., 2020; Oliván Blázquez et al., 2019; Oliván-Blázquez et al., 2023). Students answered it on a Likert-type scale from 0 to 4, where 0 meant not at all and 4 meant a lot. The seven statements were as follows: "The used teaching methodology promotes new knowledge acquisition", "It favors deep learning", "It has helped me to think more critically", "It has helped me to apply theoretical content to practice", "It has helped me to apply theoretical content to evaluations", "It has helped me to better understand the concepts" and "I think it is an appropriate teaching methodology".

We also included a free-response section to ensure that students could express themselves openly. As our team is multidisciplinary, it was considered appropriate to attach an open question of a qualitative nature, in which we asked for 'Comments on the carried out PV work', which were subsequently analyzed. The analysis was focused on detecting comments related to the different variables, extracting data according to this criterion and also paying special attention to the strengths and weaknesses expressed by students based on their experience putting this methodology into practice. The results detail some of these comments, but it would be impossible to show them all due to space limitations.

To evaluate self-efficacy in relation to task performance, we used the Spanish adaptation of the General Self-Efficacy Scale (GSES) (Baessler & Schwarzer, 1996; San Juan Suárez & Pérez García, 2000). This validated instrument assesses the global perception of effectiveness and consists of 10 items on a Likert-type scale ranging from 0 (totally disagree) to 10 (totally agree) and from 0 to 100. Its internal consistency is $\alpha = 0.91$, and the Cronbach's alpha obtained in this study is 0.929.

Age, gender and university admission grade (ranging between 0 and 14 points) were also collected. These factors were collected to establish the comparability of groups for these variables. Both variables and instruments are listed in Table 1.

Table 1. Variables and instruments used.

Variable	Instrument
Main variable:	
- Academic performance achieved during activity (inductive or deductive).	The obtained grade falls within a range from 0 to 10, and is categorized as fail, pass, noteworthy and excellent.
Secondary variables:	
- Satisfaction with the performed activity.	A self-administered questionnaire prepared ad hoc, with seven statements evaluated on a scale from 0 to 4 and one open question.
- Perceived self-efficacy.	General Self-Efficacy Scale.
- Socio-demographic and previous academic variables: gender, age and university admission grade.	Self-administered questionnaire.

All the variables were collected after the completion of the teaching activity.

2.5. Statistical Analysis

We first conducted an analysis of the data distribution for the continuous variables using the Shapiro–Wilk test, and obtained *p*-values below 0.05 for all of them. For this

reason, we used non-parametric statistics. The continuous variables were age, university admission grade, satisfaction with the performed activity (evaluated on a scale from 0 to 4), perceived self-efficacy and academic performance score; the last two variables were evaluated on a scale from 0 to 10. Then, we performed a descriptive analysis of the total sample, which showed the values of the continuous variables as means and standard deviations (SDs), medians and interquartile ranges, and the showed the categorical variables as frequencies and percentages. We chose the Mann–Whitney U statistic to compare the groups that carried out the inductive or deductive PV activity for the study variables of academic performance, satisfaction and perceived self-efficacy. A chi-square statistical test was used to analyze the categorical academic performance variable, and a multivariate analysis was conducted to analyze the variables related to obtaining a better grade in the PV activity. Linear regression was used because the model's residuals had a finite mean, constant variance and normal distribution (above all, because the sample size was large; with the central limit theorem, any distribution with a constant mean and variance has a normally distributed mean if it has a large enough sample size) (Kutner et al., 2004). Bootstrapping analysis with 2000 samples was also conducted, with the dependent variable as the grade obtained in the PV activity, ranging from 0 to 10. The independent variables included in the model were gender, age, university admission grade, whether the PV activity was conducted inductively or deductively and perceived self-efficacy. We used Spearman's Rho statistic to analyze the correlation between perceived self-efficacy and the variables of academic performance and satisfaction. We performed all statistical analyses with the SPSS 25.0 software (IBM Corp. Released, 2017, Armonk, NY, USA). Any values below 0.05 were considered significant.

3. Results

First, the participants were analyzed based on their gender, age and university admission grade. As shown in Table 2, the majority of participants were women (87.1%) with a mean age of 20.78 years (SD: 5.24), who had been admitted to the degree with a mean grade of 9.28 points out of 14 (SD: 5.10) and with a score of 73.54 (SD: 12.73). The deductive PV activity was completed by 128 students, while 126 completed the inductive PV activity. We compared the two groups—students who participated in inductive PV and in deductive PV—by gender, age, university admission grade and perceived self-efficacy at baseline. As shown in Table 2, there were no significant differences between both groups for the collected variables, except for the age variable, since they carried out their activity during different academic years.

According to the comparison of academic performance and satisfaction, as shown in Table 3, there were significant differences in the activity score, both at the continuous (0 to 10) and categorical levels. The students who completed the deductive PV activity obtained a higher score for activity (p -value < 0.001), and a higher percentage of students obtained a grade of excellent (p -value < 0.042). Regarding satisfaction with the activities, students valued both activities positively because the means of all the items was above 2.79 on a scale from 0 to 4, with a median of 3. However, there were significant differences in the items "The teaching methodology used has helped me to think more critically" (p -value < 0.001), "It has helped me to better understand concepts" (p -value = 0.005) and "I think it is a good teaching methodology" (p -value = 0.002), which were rated higher by students who performed the inductive PV activity.

Regarding the variables related to a higher score in the PV activity, as shown in Table 4, the linear regression model ($R = 0.289$; adjusted $R^2 = 0.058$; p -value = 0.007) showed that a higher perceived self-efficacy and conducting the activity inductively were predictors of a higher quantitative activity score. Both the tolerance and VIF values came close to 1, which

indicates that the independent variables did not highly correlate with one another and that there was no significant collinearity.

Table 2. Description of the variables of gender, age and university admission grade at the time of this study.

Variable	Total Sample N = 254	Deductive PV N = 128	Inductive PV N = 126	p-Value
	Frequency (%) Mean (SD)/Median (IQR)	Frequency (%) Mean (SD)/Median (IQR)	Frequency (%) Mean (SD)/Median (IQR)	
Gender (% women)	224 (88.2%)	115 (89.80%)	109 (86.5%)	0.410
Age	21.00 (5.43)/20 (2)	21.66 (5.64)/20 (3)	20.33 (5.14)/19 (3)	<0.001
Academic year				
First	103 (40.6%)	0	103 (81.7%)	
Second	130 (51.3%)	107 (86.30%)	23 (18.3%)	
Fourth	24 (8.3%)	21 (13.4%)	0	
University admission grade	9.20 (4.88)/8.73 (2.7)	8.93 (1.66)/8.82 (2.42)	9.47 (6.72)/8.6 (2.95)	0.681
Perceived self-efficacy	73.17 (12.46)/74 (18)	72.98 (11.96)/74 (15)	73.35 (13.00)/74(16)	0.633

Table 3. Comparisons between both groups regarding the quantitative and qualitative activity scores and satisfaction.

Variable	Deductive PV Group (n = 128)	Inductive PV Group (n = 126)	p-Value
	Frequency (%) Mean (SD)/Median (IQR)	Frequency (%) Mean (SD)/Median (IQR)	
Quantitative activity score	8.38 (1.47)/8.65 (1.6)	7.77 (1.11)/8 (2)	<0.001
Satisfaction (quantitative)			
Promotes new knowledge	2.79 (0.73)/3 (1)	3.02 (0.073)/3 (0)	0.068
Improves deep learning	3.02 (0.78)/3 (1)	3.15 (0.67)/3 (1)	0.908
Helps critical thinking	2.81 (0.84)/3 (1)	3.31 (0.74)/3 (1)	<0.001
Helps to apply theory to practice	3.31 (0.70)/3 (1)	3.14 (0.74)/3 (1)	0.266
Helps to apply theory to assessment	3.15 (0.749)/3 (1)	3.09 (0.68)/3 (1)	0.213
Helps to better understand concepts	3.19 (0.72)/3 (1)	3.46 (0.70)/4 (1)	0.005
Good teaching methodology	3.23 (0.71)/3(1)	3.51 (0.66)/4 (1)	0.002
Categorical activity score			
Excellent	52 (40.6%)	33 (27.96%)	0.042
Noteworthy	59 (46.2%)	65 (55.08%)	
Pass	14 (10.9%)	20 (16.94%)	
Fail	3 (2.3%)	0 (0%)	

Statistics used: Mann–Whitney U T-test to analyze activity and satisfaction; chi-square test to analyze the categorical activity score.

These results can be explained in greater depth thanks to the results of the qualitative analysis. Most significantly, in the inductive methodology, the topic corresponding to the item “Helps critical thinking” (3.31 (0.74)/3 (1) in the quantitative analysis) stands out. This issue, as we note, appears in the literature that investigates PV as a tool to work with in higher education classrooms, and we think that this is of vital importance in the social sciences. Some of the testimonies collected in this regard were the following “When it comes to taking photos, we analyze everything we criticize more, and we become more aware that everything that oppresses us is naturalized in our daily lives.”, “I found that this exercise

helped me to think more critically about the world around us and how unconsciously there is racism, sexism, etc.”; “I’ve become aware of everyday things that we do without realizing it and that have an underlying negative background” and “I liked it because it made me look around more and be more critical of my surroundings.”

Table 4. Linear regression model in relation to a higher score in the PV activity.

Variable	Coefficient	<i>p</i> -Value	95% Confidence Interval	Collinearity Statistics Tolerance	Statistics VIF
Constant	6.274	<0.001	4.490; 8.059		
Gender	0.292	0.370	−0.349; 0.934	0.946	1.057
Age	0.015	0.507	−0.030; 0.060	0.947	1.056
University admission grade	0.020	0.329	−0.020; 0.060	0.947	1.056
Inductive/deductive	−0.487	0.015	−0.878; −0.095	0.962	1.040
Perceived self-efficacy	0.023	0.005	0.007; 0.039	0.987	1.013

Another item that was highly rated in the quantitative section also appeared in the qualitative section of the study. This was specifically observable in the item “Helps to better understand concepts” (3.09 (0.68)/3 (1) in inductive reasoning). These results reinforce the relevance of this item in the students’ perception, even though statistically it did not seem particularly relevant, especially in the inductive methodology. Some of their testimonials included the following “It’s helped me to develop a better understanding of cultural exchange/appropriation concepts and how they have been generated throughout history”; “We’ve learned concepts and we’ve had a good time”; “It’s a way of acquiring new knowledge or understanding previous concepts in an entertaining way” and “It has allowed me to understand perspectives that I didn’t know”.

Finally, in relation with teaching methodology there were also comments about them finding these practices more enjoyable than the traditional reading of texts, and also feeling more involved, which improves learning: “I really liked the approach of these practices because we learn more by getting involved”; “I think it’s a good idea”; “I think it’s a more dynamic way of working”; “It’s more entertaining than a reading that we do not understand” and “It’s a more practical and dynamic way of learning; I find it very useful”. There were some negative comments about the display of images in class because some people found it repetitive. These types of comments will help us to improve future activities related to PV methodology use: “I think it’d be better to look at fewer photos and to analyze them better, and it’d be helpful to go deeper” and “It’s a bit tiring to listen to the same content during the whole class about a topic”. In general, these comments pointed out the same issue. Therefore, we now have information to improve this issue by further diversifying the work of each mini-group to avoid repetition, which could be more motivating.

In the deductive approach, we also found positive student opinions. The most common one, which was also repeated for the inductive methodology, concerned the fact that it helped them to understand and strengthen theoretical concepts (3.15 (0.749)/3 (1) in quantitative analysis) “I found it a very good exercise to strengthen the concepts taught in class”; “I found it more convenient to assimilate and reinforce the theoretical concepts of the subject”; “Thanks to these photos, it’s easier to relate theory to reality and to put it into practice” and “I found it interesting how I have been learning the different concepts lately because I had not learned them well before”. Other opinions had to do with the dynamism of this type of activity with images: “It’s been a very enjoyable group activity to

do with just a few members”; “I like the debate it provokes; it gives the class dynamism”; “It has been a different and more dynamic activity than those we usually do”; “It’s a dynamic and easier way to acquire knowledge” and “I’ve found that this activity develops learning in a fun way”. In a third block, we noted those that directly referred to using images as a teaching methodology: “Anything that has to do with the use of images is very helpful in understanding”; “I’m interested in anything that has to do with photography and audiovisuals”; “I think that images make work much easier”; “Visual practice is more striking than theoretical practice” and “I found it very useful because visual memory helps me to know concepts through images”.

Finally, some students’ opinions also helped us to improve the inductive activity. In this case, most told us about the short time that they had to carry out the activity, which would have been more conveniently performed in a large group rather than in mini-groups: “I felt the pressure of time, and the last images were developed without discussing them with my classmates”; “I felt some pressure due to the short time during which I had to think about each photo because some were more difficult for me to think about and discuss with my group”; “I’d have found it more entertaining to do it with the whole group, and by discussing why we think a photo is from one group or another” and “It was long and tedious because there were 10 images. It would have been more dynamic if it had been a practice to share with the whole class”. In this way, and thanks to this feedback, we can now consider the possibility of improving our teaching practices in future PV methodology applications.

As Table 5 shows, the relation between perceived self-efficacy and ratings given to the activity and satisfaction was analyzed. Considering the total sample, we found significant direct correlations between self-efficacy and the rating given to the activity (regardless of it being inductive or deductive) (p -value < 0.001) and satisfaction with the “Favors deep learning” (p -value < 0.05), “Helps to apply theory to practice” (p -value < 0.05), “Helps to apply theory to assessment” (p -value < 0.001) and “It is a good teaching methodology” (p -value < 0.001) items. Taking into account only the courses during which the deductive PV activity was carried out, we found significant direct correlations between self-efficacy and the rating given to the activity (p -value < 0.001) and satisfaction with the item “Helps to apply theory to assessment” (p -value < 0.05). Finally, when analyzing the students who completed the PV inductive activity, we found significant direct correlations between self-efficacy and the ratings given to the activity (p -value < 0.05) and satisfaction with the items “Favors deep learning” (p -value < 0.001), “Helps to apply theory to assessment” (p -value < 0.001) and “It is a good teaching methodology” (p -value < 0.001).

Table 5. Correlation between perceived self-efficacy and quantitative activity score and satisfaction.

Variables	Total Sample N = 233	Deductive PV N = 128	Inductive PV N = 126
	Perceived Self-Efficacy	Perceived Self-Efficacy	Perceived Self-Efficacy
Quantitative activity score	0.207 **	0.265 **	0.190 *
Satisfaction (quantitative)			
Promotes new knowledge	0.063	−0.025	0.152
Favors deep learning	0.131 *	−0.003	0.286 **
Helps critical thinking	0.033	−0.100	0.154
Helps to apply theory to practice	0.149 *	0.149	0.164
Helps to apply theory to assessment	0.269 **	0.221 *	0.340 **
Helps to understand concepts better	0.125 *	0.091	0.158
Good teaching methodology	0.240 **	0.096	0.389 **

* p value < 0.05; ** p value < 0.001.

4. Discussion

This work not only outlines the implementation of PV, but it does so from the perspective of pedagogy in higher education, where PV use has traditionally been low (Jarldorn, 2018; Mulder & Dull, 2014; Malka & Lotan, 2023; Casals & Calvo, 2022). We must highlight that we conducted this study using a comparative methodology applying PV inductively and deductively to different groups. This comparison allowed us to analyze the convenience of one versus the other by evaluating their effects on perceived self-efficacy and student performance, as well as their satisfaction with the activity. As stated in the hypotheses, the obtained results favored both the improvement in applying PV in classrooms and exploring the two application models to, thus, improve the inclusion of this participatory methodology in the T-L process in the social sciences.

First, regarding academic performance, both the comparative analysis and the regression model showed that a higher score for the activity was associated with completing it via a deductive methodology. This can be explained by the fact that inductive thinking, which is based on the observation of patterns and the generalization of conclusions, requires the ability to abstract; that is, to separate specific elements from a set to identify what is essential. This kind of thinking may be more complex and requires a deeper understanding of content (González-Labra, 2011). As for satisfaction with the activity, students reported a high level of satisfaction in both cases. This is consistent with findings from previous studies, like those by Rodríguez et al. (2022) or Ferrer-Aracil et al. (2021). When considering the differences between the deductive and inductive approaches, it is worth noting that the inductive approach obtained better scores for the items related to promoting critical thinking, acquiring knowledge and considering PV to be a suitable teaching methodology. These results are consistent with those obtained from the qualitative data of our research and with those of other authors like Oden (2013) or Haffejee (2021). These issues are particularly relevant in the social sciences, as shown by Rodríguez et al. (2022), Montoya et al. (2020), Coronado et al. (2020), Kroeger et al. (2012) or Shefer et al. (2018).

These qualitative data about both inductive and deductive aspects also showed the perception that activity was more entertaining than others usually performed in traditional teaching methodologies. These data also contributed to better understand the concepts of the different courses and to improve their learning process. These issues are closely related to the studies of Haffejee (2021), Ferrer-Aracil et al. (2021) and Rodríguez et al. (2022), current research lines that demonstrate the effectiveness of incorporating active teaching methodologies into higher education (Baepler et al., 2014; Chen et al., 2017; Njie-Carr et al., 2017; Presti, 2016; Albert & Beatty, 2014; Roach, 2014; Gómez-Poyato et al., 2020; Oliván Blázquez et al., 2019; Romea et al., 2022; Sage & Sele, 2015) considering the inclusion of PV in these methodologies as a good practice in university social science teaching. This has been suggested by different authors (Casals & Calvo, 2022; Cho et al., 2021; Cooper et al., 2017; Cornell et al., 2022; Coronado et al., 2020; Haffejee, 2021; Hernández et al., 2014; Schell et al., 2009; Musanti & dos Santos, 2020; Trout et al., 2019; Zeglin et al., 2019).

Nevertheless, our study results suggest that in future activities, we should consider how students present activity results because presenting mini-group results to a large group one by one is repetitive. Consequently, it may be necessary to explore other models based on the open gallery format, such as that of Oden (2013). In the same way, it would be interesting to leave more time for reflection on, and to debate about, each image.

Our findings support Bandura's (1977, 1994) theory, showing that perceived self-efficacy is positively associated with students' performance and satisfaction in both inductive and deductive PV applications. Perceived self-efficacy is directly and positively related to performance and to the "Favors deep learning", "Helps to apply theory to practice", "Helps to apply theory to assessment" and "It is a good teaching methodology" items.

These results coincide with those from research into the application of other active methodologies to university teaching (Ramos-Villagrasa et al., 2018; Bi et al., 2019; Keshmiri et al., 2021; Zhu et al., 2021). Therefore, these findings should be interpreted with caution, given the limited prior research directly examining the relationship between PV and self-efficacy in higher education.

Discussing the results of the inductive and deductive approaches in our research is convenient because there were some differences; for example, the results of the inductive approach obtained more significant links with the items “Favors deep learning” and “It is a good teaching methodology”. Thus, we can state that, based on students’ perceptions, it would seem more appropriate to apply the inductive approach to the social sciences, and more specifically, to the social work degree in which it was applied. This methodology generates a greater sense of usefulness and promotes critical thinking and learning. In the qualitative analysis, students reported that while both methodologies helped make theoretical concepts more understandable, the inductive approach particularly fostered critical thinking and reflective engagement by allowing them to observe and interpret concepts through photography. These results align with theories of self-efficacy, as actively creating and selecting images provides mastery experiences, increases confidence in analyzing and applying theoretical knowledge and promotes agency and motivation (Bandura, 1997; Schunk & Pajares, 2001; Zimmerman, 2000; Jääskelä et al., 2017). By connecting classroom concepts to their environment, students enhanced their critical reflection, demonstrating how inductive PV can strengthen both cognitive and affective dimensions of learning. We must bear in mind that, in the social sciences, observing, interacting and being in the field is fundamental. Since it emerged in the mid-nineteenth century, photography has been used as a scientific observation tool; therefore, taking photographs is itself a recognized research methodology (see the Section 1). This is why we believe that the inductive approach is rated more highly as a learning tool and as a way to deepen acquired knowledge. We also understand that the deductive approach obtained a better overall score because it is easier to put into practice, and there were more A’s in the evaluation of the carried out work. Students who are more used to written language found it difficult to visualize the concepts worked on in class in images and to transmit them through images. However, as our research results reveal, despite the added effort that this approach entails, a better score is obtained in the items highlighted throughout the text. Both approaches advocate introducing the language of the image at the same level as the written language. This is why this type of study helps us to introduce new methodologies that make learning more meaningful, which encourages student participation. As we noted at the beginning of this article, this is a methodology that arises from the social sciences research field, and it has been shown to be effective in teaching, both in this study and the other studies that we have cited throughout the article. However, it must be planned based on prior knowledge for it to be truly meaningful.

These findings highlight the potential of PV as a transformative pedagogical tool in social sciences higher education. Future research should explore these effects in larger, more diverse samples and examine how different PV instructional designs influence self-efficacy, academic performance and satisfaction over time.

This study has several limitations that we should acknowledge. First, because we did not select the groups and no control group was randomly included, the observed differences cannot be attributed solely to the types of teaching activities. Second, satisfaction and self-efficacy were measured using self-reported instruments, which are subjective psychological constructs and may be influenced by individual biases. Third, teachers conducted pedagogical activities across different social science courses, covering a range of knowledge areas. Although this allowed for a broader understanding of PV applications, it

also introduced varying levels of difficulty that may reflect the inherent complexity of each subject rather than the activity itself. While teaching assessments typically consider task difficulty along with students' prior knowledge and motivations, this heterogeneity should still be recognized as a limitation. Fourth, academic performance was measured using the grades obtained in the activity. However, this is common practice in the educational field, and rubrics help standardize evaluation based on required competencies; grades remain a limited proxy for learning outcomes. Finally, these results should be interpreted with caution, as we conducted our analyses with 254 students from different academic years and courses. Although this sample exceeded the minimum required size by 88 students, increasing the sample size, recruiting a more homogeneous group in terms of courses and subjects, and randomly assigning individual participants rather than entire class groups would have yielded stronger scientific evidence.

Despite these limitations, this study contributes to the limited body of literature comparing inductive and deductive PV methodologies. It offers initial evidence regarding their effects on students' satisfaction, self-efficacy, and academic performance. Further research with larger, randomized, and more homogeneous samples is needed to consolidate these findings.

5. Conclusions

In conclusion, our research helps to establish that the application of active methodologies improves the T-L process and is positively valued by students. One of these methodologies is PV, which was initially created as a participatory research methodology and whose usefulness in higher education has been demonstrated. In this study, we corroborated its effectiveness and analyzed its possible applications and effects on students. Our results indicate the greater suitability of the inductive model, which promotes the learning of concepts and their relationship with the environment surrounding students, improves class dynamics and increases their critical thinking. Consequently, the technique allows students to build crucial skills for their future professional work. These findings support the potential of PV as a pedagogical tool, even when partially applied. Future research will focus on the formal implementation of the full PV methodology in social work education, including the initial phase of raising critical awareness and the final phase of the dissemination of the results, to more comprehensively explore its transformative impact.

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Institutional Review Board Statement: Ethical review and approval of this study has been waived due to the active participation of the informants in the study. In accordance with the criteria of the Research Ethics Committee of the Autonomous Community of Aragón (CEICA), the RD1090/2015 and Law 14/2007, this work does not involve an invasive procedure or a clinical trial and/or observational study. Furthermore, no personal data were used that were not previously available in the entity in which the co-authors work and which participated in the research process. This entity already has authorization for its processing in accordance with its mission, and according to Law 3/2018, on the Protection of Personal Data and guarantee of digital rights. In addition to this Law,

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Abbreviations

The following abbreviations are used in this manuscript:

PV Photovoice
T-L Teaching–learning

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