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## Implicit Theories on Learning Assessment and the Use of Triangulation as a Means of Qualitative Validity and Reliability

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### Abstract

This article discusses assessment practices in primary education and implicit theories in teaching. Cultural practice and social interactions in the classroom create personal experiences, which are the basis for teachers' individual mental representations, known as implicit theories. These conceptions guide their teaching, but they are not generally studied, unlike the theories of the scientific community. Although implicit theories may be different, teachers from the same educational institution generally share them and they regulate them in relation to the context. This study seeks to identify and interpret the implicit theories on learning assessment of a primary school teacher in Puno, Peru. The methodology used was grounded theory. For this purpose, the empirical method, such as participant observation and in-depth interviews, was used. The main result was identifying in the teacher an assessment practice with a prevalence of constructive and interpretive theory traits.

### Keywords

learning assessment, implicit theories, grounded theory, triangulation, primary education

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# Implicit Theories on Learning Assessment and the Use of Triangulation as a Means of Qualitative Validity and Reliability

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This article discusses assessment practices in primary education and implicit theories in teaching. Cultural practice and social interactions in the classroom create personal experiences, which are the basis for teachers' individual mental representations, known as implicit theories. These conceptions guide their teaching, but they are not generally studied, unlike the theories of the scientific community. Although implicit theories may be different, teachers from the same educational institution generally share them and they regulate them in relation to the context. This study seeks to identify and interpret the implicit theories on learning assessment of a primary school teacher in Puno, Peru. The methodology used was grounded theory. For this purpose, the empirical method, such as participant observation and in-depth interviews, was used. The main result was identifying in the teacher an assessment practice with a prevalence of constructive and interpretive theory traits.

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## Introduction

The communication and mathematics curriculum areas are considered essential due to their impact on developing capacities and are based on a text-based communicative approach and a problem-solving approach, respectively. A sign of its importance to the Ministry of Education is that students are instructed in their schools a few days before the Student Census Assessment (ECE), which consists of the application of standardized tests that show how much students from the second grade of primary education are learning.

Teachers' assessment practices are influenced by their perception of the world; that is, experiences and theories used both consciously and unconsciously when conducting their teaching work. To comprehensively analyze such practices, it is necessary to overcome the unilateral or partial approach, leading, in contrast, to the beginning of a substantive theory and triangulation, allowing multilateral and valid knowledge of the reality under study.

This research seeks to identify and interpret the implicit theories of a teacher and validate the results through triangulation. With this in mind, the following question was posed: how does triangulation contribute to the validity of the results after identifying the implicit theories of a teacher when assessing learning among her students? Given the need to gain in-depth knowledge of a teacher's assessment practice, qualitative data were obtained through observation, semi-structured interviews, and document analysis. The triangulation of personal data was used as a validity criterion with which to identify implicit theories.

## **Implicit Theories**

Implicit theories are hidden networks of knowledge that underlie the models with which we interpret the world (Antón Nuño, 2012; Gonzales, 2012; López-Vargas & Basto-Torrado, 2010; Pozo, 2008). These are built in a specific sociocultural context (Arévalo Alvarado, 2009; Boullosa, 2014; Makuc, 2008; Raygada-Leveratto, 2015). Rodrigo et al. (1993) define them as “mental representations that are part of an individual’s knowledge system and participate in the processes of comprehension, memory, reasoning, and action planning” (p. 13). They are also “the epistemic constructions of representation of reality that mediate knowledge, guide the actions of subjects, and reflect the influence of diverse cultural models” (Errázuriz, 2017). Conti Perochena (2013) surmises that there may be dissociation between what a teacher says teaching is (explicit representations) and how it is actually practiced in the classroom (implicit representations). Taking this into account, literature, interviews, and in-depth observation are generally used to help us detect an implicit theory (Gómez, 2008; Loo, 2013).

However, there are different types of implicit theories. We rely on the typology from Pozo (2006), for whom implicit theories include direct, interpretive, and constructive theories. Each of these types is generally evaluated quantitatively. Below, we will explore the characteristics of these constructs.

### **1. Direct theory**

Direct theory is a part of traditional learning where neither thematic content nor learning is contextualized. This type assumes an evident academic and rote learning bias (Cossío Gutiérrez & Hernández Rojas, 2016; Palma, 2010; Pozo, 2006). According to Vilanova et al. (2007), a certain determinism is seen in believing that an objective (success) will be achieved under certain predefined conditions to learn something. Its epistemological basis is naïve realism, since learning is never a faithful copy of the object, nor can the psychological processes involved in its apprehension be ignored. Ontologically, learning does not consider context; its exclusive logic leads us to think that one learns or does not learn. There are no nuances or levels of achievement; rote assessment is used to obtain a result through written tests.

### **2. Interpretive theory**

The teacher remains the manager and the only one who assesses, even when paying attention not only to the outcome, but also to the process and conditions of learning. According to Vilanova et al. (2007), learning to obtain a faithful copy of the object is a conviction shared with direct theory. At the epistemological level, we find critical realism. At the ontological level, learning is considered a process that requires practice and time. Despite having developed from direct theory, and considering the mental processes (memory, attention, association) used by students, it still considers assessment necessary because it provides a progressive learning outcome. This is obtained after several attempts and repetitions or learned by doing and through the guidance of mentors. Quantitative assessment is done at the beginning and end of the process (entry test, exit test).

### **3. Constructive theory**

An object is transformed when it is apprehended by a person. During the interaction between the learner and the content to be learned, modifications are applied to not only the learner’s conceptual schema, but also the original content. However, if our representations

about the physical, mental, or sociocultural world are reconstructed by the mental processes involved in learning, it is not surprising that the same information can be renamed by different people who are learning. The interaction in real contexts, the items, and the portfolio are assessment techniques and instruments under a constructivist theory. The role of assessment is that of self-regulation by teachers and students. In this process, there are no assessments at the beginning or at the end: if the reconstructive mental processes are constant, then the assessment must be too. Sometimes, the assessment is qualitative, based on the students' criteria. There is also no single optimal outcome. At the heart of the problem is the cognitive structure and psychological processes. The epistemological support was relativistic.

### **Cultural Characterization of the Place of Study**

The Puno region is located in the southeastern part of Peru. It has a surface area of 71,999 km<sup>2</sup>, making it the fifth largest department in this country, with 61% being in the Andes and 32% in the jungle. According to the Peruvian National Institute of Statistics and Information Technology (INEI), it had a population of 1,429,098 inhabitants in June 2016, and a 4% decrease in the rural population occurred due to an accelerated urbanization process.

In 2015, the Ministry of Education created a type of UGEL based on the different characteristics of the territories and the educational institutions that were to be managed, as well as the operating conditions to manage the territory. The UGEL in Puno was classified as type D; that is, with greater operational capacity and presenting an intermediate territorial challenge. Puno had educational achievements in math and reading comprehension in the second grade of primary school. Between 2011 and 2014, it went from 7.5% and 18.5% to 30.2% and 42.4%, respectively. Daycare attendance also improved (62.3% in 2011 to 71.0% in 2014). For Ciudadana (2016), this was achieved “in a highly adverse context: areas with a high rate of poverty, linguistic diversity (Quechua, Aymara, and Spanish), rural areas on the border, and radicalized sectors of teachers” (p. 5).

The teacher, the unit of analysis of this study, is a 56-year-old woman with 30 years of teaching experience. She is the oldest and most experienced; she works in the fifth cycle (fifth and sixth grade) of primary school, in the mathematics curriculum. She is at level three of her public education career, and is a teacher appointed by the Peruvian government. She is also in charge of the “Science and Environment” and “Education through Art” areas. In Puno, the educational institution No. 70010 “Gran Unidad Escolar San Carlos” is one of the oldest: it was established 193 years ago by the supreme command of the Liberator, Simón Bolívar, on August 7, 1825. In 2009, it was recognized by the Ministry of Education as a flagship educational institution. At the end of 2015, it was no longer a boys-only school and became a mixed school.

### **Methodology**

#### **Design**

This study is based on a qualitative approach and the design used was grounded theory (Espriella & Gómez, 2020), which allows the development of theories, propositions, and concepts, having as a starting point the data obtained from reality, instead of from formal theoretical frameworks or previous research. This type of study is not intended to remain descriptive, but to identify the implicit theory present in the teacher and be able to contrast it with the existing formal theory; that is, the substantive theory that emerges from the empirical, unlike the formal theory that is oriented toward the development of a certain conceptual area (Glaser & Strauss, 1967). It is possible to confirm that concern for constructing a theory of

reality based on the contrast between theory and the phenomenal world underlies that mentioned above. Furthermore, this design allows us to understand the meaning of the personal experience of a particular individual through a descriptive and inductive method in handling different data sources (Pérez Serrano, 2016), which aligns well with our objective.

To move from the substantive to the formal theory of the design used, I present three moments. The first approximates the socio-educational reality from the formal theory, which allowed central a priori categories to be established. This formal theory was based on a review of the theoretical contributions by Pozo (2006) and Pozo (2008). The second moment is characterized by being inductive through participant observation, professional interviews, unity, and document analysis, enabling an understanding of the meanings of the teacher about her evaluative practice by analyzing the data collected, thereby obtaining a theoretical model that comes from the preliminary conclusions of the study. Finally, the third moment corresponds to the confrontation of the findings obtained from the empirical reality (emerging categories) and the theoretical framework assumed by the researcher, which allows for a deep understanding of the reality of the study.

## **Participants**

In this study, we selected a teacher through convenience sampling. The inclusion criteria considered were as follows: over 20 years of experience in a school, teaches mathematics, knows the sociocultural context of students, and appointed in public school. The teacher found is a 56-year-old third level teacher of mathematics, qualified and appointed with more than 30 years of service. We agree with Mejía-Navarrete (2000) that:

A qualitative sample allows us to obtain results that can be generalized universally, within the limits of socio-structural representativeness ... The relationships that socially configure the object of study must be represented, unlike quantitative samples, where representativeness is given. (p. 167)

## **Techniques and Instruments**

In this study, the relevant instruments for collecting qualitative information included a triangulation of observation sheets, an interview guide, and a record of document analysis. The original use of the term “triangulation” comes from measuring horizontal distances during topographic surveys since “it represents the researcher’s goal of looking for patterns of convergence to develop or corroborate a general interpretation of the human phenomenon under study” (Okuda-Benavides & Gómez-Restrepo, 2005, p. 119). In our research, a guide for in-depth qualitative interviews was used. This guide had six questions and its objective was to gather the teacher’s perceptions and meanings about the function, criteria, techniques, instruments, moments, and people in charge of the assessment. The classroom observation guide had six questions and allowed us to collect information directly regarding the assessment practice developed by the teacher during the teaching and learning process. The last instrument used was the document analysis sheet. These instruments were validated using an expert opinion. Therefore, it was possible to determine the similarities and differences between the different research instruments to reach preliminary and conclusions on implicit theories about the assessment of the primary teacher’s learning.

## **Data Analysis**

The researcher conducted fieldwork and direct observation to learn the teacher's behavior in the teaching-learning processes, the main source being the in-depth interview. A database made up of the following documents was created: (a) general data of the interviewee, (b) informed consent, (c) related documents, (d) field diary notes file, and (e) interview transcripts. The interview was conducted with a guide to obtain knowledge about the assessment practice of teachers, considering the research questions and objectives. For the information analysis, the steps provided by Strauss and Corbin (2002) – open, axial, and selective coding – were considered.

For the processing and analysis of the information, the three moments (descriptive, analytical, and interpretative) established by the authors linked to grounded theory were considered. According to Strauss and Corbin (2002), microanalysis is a key step in theory construction: “Through careful scrutiny of the data, line by line, researchers discover new concepts and novel relationships, and systematically construct the categories in terms of their properties and dimensions” (p. 79).

This is done with the aim of progressively finding conceptions or mental representations, to develop coded phrases (emerging subcategories) and, in this way, reach conclusions. This process, according to the authors, is completed in three steps. First, the concepts are identified and the properties and dimensions of the data are found, performing the phrase-by-phrase analysis of the collected data (open coding). Then, the emerging categories and subcategories are related to obtaining axial coding; in this way, interpretive categories are generated. Finally, the emerging categories and subcategories are compared with the theory to obtain preliminary conclusions within the framework of a theoretical-explanatory model thanks to “selective coding.” This entire process considers the conversion of information, presentation, and analysis (Miles & Huberman, 1994).

## **Validity**

Triangulation is a research tool that allows perspectives on the same reality to be compared. This combination could include different entities, times, themes, and spaces. Additionally, Cisterna (2005) states that triangulation is essentially hermeneutical because the data collected from various sources is then dialectically processed. In dialog with that mentioned by Cisterna, for Rodríguez Sabiote et al. (2005), the codes created can be prioritized (built before the information collection process) or emergent (emerge from significant references of the same research). According to Olsen (2004), the result must be a fruitful dialog based on the contrast between that which is clear and the official interpretations of the object of study. However, for Taylor and Bogdan (1998), triangulation is a “piece of systematic research carried out with rigorous procedures, but not necessarily standardized” (p. 22).

Various typologies of triangulation have been proposed. For example, Bisquerra (2019) identifies four types of triangulation: researcher triangulation, theoretical triangulation, methodological triangulation, and multiple triangulation. Another classification assumes that triangulation can be based on data collected on different dates, places, and people (different subject samples; Aguilar Gavira & Barroso Osuna, 2015). Thirdly, the triangulation of personal data is a subtype that, in turn, merits a disaggregated analysis of individual people, their interactions, and their collective roles (Arias Valencia, 2000). It is this last type that is the canvas of our study.

Beyond the type of triangulation, there is an unresolved debate about the role of triangulation: for some, it is a pertinent strategy to approach a much broader understanding of the reality studied (Betrián-Villas et al., 2013), while for others it is a control procedure to

guarantee the reliability of the qualitative data collected (Bericat Alastuey, 1998). Denzin (1970) and Campbell and Fiske (1959) are the identified origin of this division of perspectives (Aguilar Gavira & Barroso Osuna, 2015; Alzás Garcia et al., 2016). We intend to incorporate both elements practically; we use various collection strategies in addition to an emerging code comparison matrix, and we incorporate comparisons between categories within the same axial and selective coding process. We will present both the implicit theories discovered through different harvesting strategies and the conclusions derived from the cross-comparison of codes because of our different harvesting techniques.

## Results

This study aims to identify the implicit theory of a teacher regarding her assessment practice. To do so, six a priori subcategories were established: the concept and function of the assessment, assessment criteria, assessment techniques and instruments, time of assessment, subjects, and people in charge of assessment and qualification. The results are presented considering each instrument used, through open and axial coding. Finally, the codes were validated by comparing the codes obtained through each instrument used. The results obtained are presented in tables below.

**Table 1**  
*Coding and questions*

| Category                   | Aprioristic sub-category   | Question  | Coded phrases (teacher's response)   | Codes |
|----------------------------|--|---|--|-------|
| <b>Learning assessment</b> | Concept and Function of the assessment. What is the evaluation for?    | 1. What do you understand by "learning?" What is the meaning of "learning assessments" for you? | Learning is a process to achieve learning in a certain time.                                   | B1    |
|                            |  |   | Assessment refers to the progress – how much one has worked and how much one has accomplished. | B2    |
|                            |  |   | It values the cognitive aspect comprehensively.  | B3    |
|                            | Assessment criteria. What is assessed?                                 | 2. What criteria do you use when assessing learning among your students?                        | Content, skills, capacities to be able to face life.   | B4    |
|                            |  |   | To be competent to face reality.   | B5    |
|                            | Assessment techniques and instruments of teachers. How is it assessed? | 3. What instruments do you use to assess your students?   | Oral and written tests.  | B6    |
|                            |  |   | Dissertations or presentations of students, group works.                                       | B7    |
|                            | Moments of assessment. When is it assessed?                            | 4. What moment do you consider is the most precise to assess                                    | Assessment should be constant.   | B8    |
|                            |  |   | Input and process assessments.   | B9    |

| Category | Aprioristic sub-category  | Question   | Coded phrases (teacher's response)  | Codes             |
|----------|---|--|---|-------------------|
|          |   | learning among your students?<br>Why?  |   |                   |
|          | People in charge of the assessment.<br>Who conducts the assessment? | 5. At the educational institution, is the teacher often the only one in charge of assessing learning? What do you think of this? | All parties involved in education.<br>In principle, there are teachers, students, and parents                           | B10<br>B11        |
|          | Grading   | 6. Which one prevails in grading: quantitative or qualitative? Reasons and details of the mechanisms.                            | The qualitative part.<br>The assessment, by the context.<br>It considers qualities and capacities shown by the student. | B12<br>B13<br>B14 |

### Analysis of coded data from observed classes

The results obtained from the guide for observation that allowed us to organize, analyze and interpret the evidence found are shown in the following table. The objective is to discover conceptions or mental representations of the teacher. We have considered the category, the aprioristic subcategories, the question and, based on the answers, the separation of the coded phrase (investigator's assessment), giving it a code to come to tentative conclusions. For this, the definition from the categories of study of the implicit theories (direct, interpretive and constructivist) was assumed.

**Table 2**

*Data and coding from the guide for observation of the teacher*

| Category | Aprioristic sub-category  | Question  | Coded phrase (investigator's assessment)   | Code |
|----------|---|---|--|------|
|          | Concept and function of the assessment. What is the evaluation for? | 1. What do you understand by "learning?" What is the meaning of "learning assessments" for you? | The teacher assesses the teaching result, the student has several answers, but for the teacher, only that one approaching the model given by him/her is valid. | B1   |

| Category                   | Aprioristic sub-category   | Question   | Coded phrase (investigator's assessment)   | Code |
|----------------------------|--|--|--|------|
| <b>Learning assessment</b> | Assessment criteria. What is assessed?                                 | 2. What criteria do you use when assessing learning among your students?   | The teacher assesses the contents developed during the learning session.   | B2   |
|                            | Assessment techniques and instruments of teachers. How is it assessed? | 3. What does the selection of an instrument to assess your students depend on?   | The assessment techniques and instruments promote the resolution of mathematical problems through written tests, presentations, and application sheets.  | B3   |
|                            | Moments of assessment. When is it assessed?                            | 4. What moment do you consider is the most precise to assess learning among your students? Why?                                  | The teacher assesses during the completely learning session, at the beginning by collecting previous knowledge, during the session through oral participation by means of questions formulated to students, and, finally, students present their works on problems resolution. | B4   |
|                            | People in charge of the assessment. Who conducts the assessment?       | 5. At the educational institution, is the teacher often the only one in charge of assessing learning? What do you think of this? | The assessment is conducted both by the teacher and the student (coevaluation).  | B5   |
|                            | Grading  | 6. Which one prevails in grading: quantitative or qualitative? Reasons and details of the mechanisms.                            | In the auxiliary record, the grading on a scale of 20 prevails; i.e., it is quantitative.  | B6   |

## Documentary analysis of data

Table 3 shows the results obtained from the documentary analysis that allowed us to organize, analyze and interpret the information considering the aprioristic categories, separate coded phrases by giving them a code. For this, the definition from the categories of study of the implicit theories (direct, interpretive and constructivist) was assumed.

**Table 3**

*Data and coding from the sheet for documentary analysis of the teacher*

| Category                   | Aprioristic sub-category   | Question   | Coded phrase  | Code  |    |
|----------------------------|--|--|---|---|----|
| <b>Learning assessment</b> | Concept and function of the assessment.                                | 1. What do you understand by   | Make judgments for decision-making  | B1  |    |
|                            | What is the evaluation for?  | “learning?” What is the meaning of “learning assessments” for you?       | (Institutional Education Project).<br>Sequenced basic contents (annual curriculum plan).        | B2  |    |
|                            | Assessment criteria. What is assessed?                                 | 2. What criteria do you use when assessing learning among your students? | Assessment of educational and technical actions.<br>To assess curricular activities (RI).       | B3  |    |
|                            | Assessment techniques and instruments of teachers. How is it assessed? |  | 3. What does the selection of an instrument to assess your students depend on?                  | Assessment record (annual work plan).   | B4 |
|                            |  |  |   | Record of assessment and educational institution attendance (RI) of students.   | B5 |
|                            |  |  |   | Keep the auxiliary and official records of attendance and assessment (classroom plan).  | B6 |
|                            |  |  |   | Observation, oral tests, written tests, assessment sheets, checklists, review of notebooks, active participation, individual works, collection of anecdotes, agenda, application sheets, group works. |    |
|                            | Moments of assessment. When is it assessed?                            |  | 4. What moment do you consider is the most precise to assess learning among your students? Why? | Quarterly   | B7 |
|                            |  |  |   | Annual (Directive #004-VMGP-2005).  | B8 |
|                            |  |  |   | Quarterly assessment (Annual Plan).   | B9 |
|                            |  |  | Comprehensive and permanent assessment  | B10   |    |

| Category | Aprioristic sub-category   | Question  | Coded phrase  | Code       |
|----------|--|---|---|------------|
|          |  |   | (classroom internal regulations).<br>-Title: addition properties<br>-Area: mathematics<br>-Indicators: applies correctly the properties of addition and subtraction in the resolution of problems<br>-Beginning: motivation (dialog)<br>-Previous knowledge: Why it is important to know the properties of operations<br>-Cognitive conflict<br>-Process: Building knowledge<br>-Application of knowledge<br>-Output: Assessment, presentation of problems to be evaluated by other groups<br>-Meta-cognition: what did I learn?<br>-Extension: application sheet of text from the Ministry of Education of Peru.<br>(Learning session).<br>Quarterly assessment of mathematics, multiple alternatives (schedule of evaluations). | B11        |
|          | People in charge of the assessment. Who conducts the assessment? | 5. At the educational institution, is the teacher often the only one in charge of assessing learning?<br>What do you think of this? | Teachers and parents (General Education Act 28044).<br>Quarterly assessments applied by the sub-directorate (RI).   | B12<br>B13 |
|          | Grading  | 6. Which one prevails in grading: quantitative or qualitative? Reasons  | The grading scale in primary school is literal and descriptive (AD, A, B, C), (Directive #004-VMGP-2005).   | B14        |

| Category | Aprioristic sub-category | Question                       | Coded phrase | Code |
|----------|--------------------------|--------------------------------|--------------|------|
|          |                          | and details of the mechanisms. |              |      |

### Axial Coding

According to Strauss and Corbin (2002, p. 134), axial coding is the “process of relating categories to their subcategories. It is known as ‘axial’ because coding occurs around the axis of a category, and links categories depending on their properties and dimensions.” Its objective is to start the process of regrouping cut or “fractured” data during open coding. To come to more complete explanations about the phenomena, axial coding categories are related to their subcategories. Some basic tasks should be done to make axial coding concrete, such as:

- To accommodate properties of a category and its dimensions, a task that starts during open coding.
- To identify the variety of conditions, actions/interactions and consequences associated to a phenomenon.
- To relate a category to its subcategories by means of sentences that indicate the relation to each other.
- To look for keys in data that indicate how the main categories can be related to each other (Strauss, 1987 cited by Strauss & Corbin, 2002, p. 137).

The following tables show the results obtained from the semi-structured interview for each of the categories. With this coding, we obtained the emerging subcategories (axial coding) to reach tentative conclusions in the participating teacher.

**Table 4**  
*Semi-structured interview of the teacher*

| #  | Categories   | Codes          | Emerging subcategories                    | Tentative conclusions   |
|----|--|----------------|---|---|
| 01 | Concept and function of the assessment. What is the evaluation for?    | B1<br>B2<br>B3 | Assessment as a result.                   | The teacher assesses the planned learning and learning obtained by students during a certain period to know the progress of complying with what has been planned. |
| 02 | Assessment criteria. What is assessed?                                 | B4<br>B5       | Contents, skills, and attitudes           | The teacher assesses contents, skills and attitudes that allow her to reflect on different situations of reality.   |
| 03 | Assessment techniques and instruments of teachers. How is it assessed? | B6<br>B7       | Oral and written tests and presentations. | The teacher uses oral and written tests, presentations of students, and group works that allow the argumentation and interaction between students and teacher.    |
| 04 | Moments of assessment.   | B8<br>B9       | Formative evaluation                      | The teacher assesses at all times and on an ongoing basis; she assesses at the beginning, during the process and at the end. This                                 |

|           |  |                   |                                       |   |
|-----------|--|-------------------|---------------------------------------|---|
|           | When is it assessed?   |                   |                                       | promotes the interaction between students and teacher during the learning session.  |
| <b>05</b> | People in charge of the assessment. Who conducts the assessment? | B10<br>B11        | Assessment by the teaching community. | The teacher states that all parties involved in education are people in charge of the assessment. In principle, we have the teacher and student, without disregarding the participation of parents. |
| <b>06</b> | Grading  | B12<br>B13<br>B14 | Prevalence of qualitative assessment  | The teacher performs mainly a qualitative assessment, of the context; she considers the qualities and capacities of the student.  |

In Table 5, information obtained from observation through emerging subcategories is organized to come to tentative conclusions.

**Table 5**  
*Observation of learning sessions of the teacher*

| #         | Categories   | Code | Concept map of emerging subcategories   | Tentative conclusions   |
|-----------|--|------|---|---|
| <b>01</b> | Concept and function of the assessment. What is the evaluation for?    | B1   | To grade and make decisions.<br><br>Assesses contents planned for the learning unit.  | To assess is to qualify the process of teaching and learning conducted by the student with the objective of achieving learning. Taking a final assessment to make decisions.  |
| <b>02</b> | Assessment criteria. What is assessed?                                 | B2   | Written tests and presentations.<br><br>At the beginning, during, and after the learning unit.<br><br>Hetero-evaluation and coevaluation. Qualitative assessment. | The teacher assesses contents planned for the learning unit. Criteria are qualitative rather than quantitative because students produce knowledge through the interaction with their classmates, sharing opinions, and reflecting on problem resolutions. |
| <b>03</b> | Assessment techniques and instruments of teachers. How is it assessed? | B3   |   | The techniques and instruments used by the teacher were written tests, presentations, formulation of problems, problem resolution, and raising of new problems, which allow them to argue and   |

| #      | Categories  | Code | Concept map of emerging subcategories | Tentative conclusions  |
|--------|---|------|---------------------------------------|--|
|        |   |      |                                       | interact with their classmates, supervised both by the teacher and the student.  |
| 0<br>4 | Moments of assessment.<br>When is it assessed?                      | B4   |                                       | The teacher assesses the process of teaching and learning in different moments, at the beginning by collecting previous knowledge, during classes by means of oral participation through presentations, and, at the end, by conducting a meta-evaluation and feedback of what was taught in class. |
| 0<br>5 | People in charge of the assessment.<br>Who conducts the assessment? | B5   |                                       | The person in charge of the assessment is essentially the teacher and the student himself/herself, or this role can be shared between students.  |
| 0<br>6 | Grading   | B6   |                                       | There are symbols in the auxiliary record; however, there is also an assessment on a scale of 20 (from 0 to 20).   |

Table 6 shows the tentative conclusions because of the organization, analysis, and interpretation of categories, coding and emerging subcategories of the teacher participating in the investigation.

**Table 6**  
*Documentary analysis*

| #      | Categories  | Code     | Emerging subcategories   | Tentative conclusions   |
|--------|---|----------|--|---|
| 0<br>1 | Concept and function of the assessment. What is the evaluation for? | B1<br>B2 | Make judgments to make decisions on contents developed in class. | From the educational kit of the teacher, we can see that there is an assessment to make judgments and decisions with students. It is based on the National Education Project and the Annual Curriculum Program, where sequenced |

| #      | Categories   | Code                         | Emerging subcategories   | Tentative conclusions   |
|--------|--|------------------------------|--|---|
|        |  |                              |  | basic contents are found, and its objective is to conduct a formative assessment.   |
| 0<br>2 | Assessment criteria. What is assessed?                                 | B3                           | Teaching and technical documents.  | In her teaching and technical documents, the teacher promotes a formative assessment through the construction, production, and creation of knowledge, in situations of interaction and reflection through different scenarios.  |
| 0<br>3 | Assessment techniques and instruments of teachers. How is it assessed? | B4<br>B5<br>B6               | Official and auxiliary records of assessment and different assessment instruments.                                 | Assesses through different techniques and instruments such as: official and auxiliary records of assessment, observation, oral tests, written tests, assessment sheets, checklists, review of notebooks, active participation, individual works, collection of anecdotes, agenda, application sheets, group works, interaction with students, context and materials, which are controlled by the teacher and the student himself/herself. |
| 0<br>4 | Moments of assessment. When is it assessed?                            | B7<br>B8<br>B9<br>B10<br>B11 | Diagnostic assessment, during the process and at the end, including the learning unit, quarterly and annual tests. | Assesses in different moments of the process of teaching and learning, at the beginning by permanent motivation about the whole learning session, during the process of learning construction, and the end of the class by metacognition: What did I learn? What difficulties did I face? How did it go? What should I do to improve?<br>By self-assessment, coevaluation, and hetero-evaluation, quarterly and annually.                 |
| 0<br>5 | People in charge of the assessment. Who conducts the assessment?       | B12<br>B13                   | Teachers, parents, and sub-directorate.  | Assessed by the teacher and students during the whole process of teaching and learning. At the same time, promotes participation of parents, and the academic sub-directorate participates at the end of each academic quarter.   |
| 0<br>6 | Grading  | B14                          | The assessment is literal and descriptive.   | The grading scale in primary school is literal and descriptive (AD, A, B, C), the equivalence is: AD (17 to 20), A (13 to 16), B (11 to 12) and C (0 to 10).  |

### Triangulation matrix

Triangulation is one of the most important techniques for the analysis of qualitative data and, as argued above, for guaranteeing their validity and reliability. With it, the collection and dialectical crossover of information related to the unit of analysis is materialized. It is done once the collection of information has ended, considering the categories and subcategories,

incrementing consistency of findings, and building a greater understanding of the reality studied.

Table 7 shows the results obtained from triangulation, considering the findings from each instrument. Agreements and divergences are presented to come to preliminary conclusions for each sub-category.

**Table 7**  
*Teacher under study*

| Category                   | Sub-category                       | Conclusions from data analysis – triangulation   |   |   | Agreement / Divergences   | Preliminary conclusions.   |
|----------------------------|------------------------------------|--|---|---|---|--|
|                            |                                    | Guide for interviewing teachers  | Guide for observation   | Sheet of documentary analysis of teachers   |   |  |
| <b>Learning assessment</b> | Concept and function of assessment | The teacher assesses planned learning and learning obtained by students during a certain period to know the progress of what has been planned. | To assess is to grade the learning process conducted by the student with the purpose of knowing the level of achievement in the teaching provided by the teacher, taking a final assessment for making decisions. | From the educational kit of the teacher, we can see that there is an assessment to make judgments and decisions with students. It is based on the National Education Project and the Annual Curriculum Program, where sequenced basic contents are found. Its objective is to conduct a formative assessment. | During the interview, the teacher assesses the planned learning during a determined period to know the progress in relation to what was planned. During the observation, the teacher grades the result of the process of teaching and learning, and, in the documentary analysis, she assesses to make judgments for decision-making. | During the interview, the teacher assesses the result of contents taught by her; during the observation, she assesses the contents to grade the process of teaching and learning of the student provided by the teacher, obtaining a final assessment. In contrast, in the documentary analysis we can see that there is an assessment to make judgments and make decisions with students. It is based on the National Education Project and the Annual Curriculum |

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|                     |   |   |  |   |  |
|---------------------|---|---|--|---|--|
|                     |   |   |  |   | Program, seeking to conduct a formative assessment.  |
| Assessment criteria | The teacher assesses contents, skills and attitudes that allow her to reflect on different situations of reality. | The teacher assesses contents planned for the learning unit. Criteria are qualitative rather than quantitative because students construct knowledge through the interaction with their classmates, sharing opinions, and reflecting on problem resolutions. | In her teaching and technical documents, the teacher promotes a formative assessment through the construction, production, and creation of knowledge in situations of interaction and reflection through different situations. | During the interview and observation, she assesses planned contents, and, in the documentary analysis, she promotes a formative assessment. | During the interview, the teacher assesses contents, skills, and attitudes that allow her to reflect on several situations of reality; during the observation, she assesses contents planned for the learning unit. It is also observed that knowledge is constructed by interacting with classmates, as they comment and reflect on problem resolution. In contrast, in the documentary analysis a formative assessment is shown through the construction, production, and creation of knowledge in situations of interaction and reflection through different scenarios. |

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|                                       |  |   |   |   |   |
|---------------------------------------|--|---|---|---|---|
| Assessment techniques and instruments | The teacher uses oral and written tests, presentations of students, and group works that allow the argumentation and interaction between students and teacher. | The techniques and instruments used by the teacher were written tests, presentations, formulation of problems, problem resolution, and raising of new problems, which allow them to argue and interact with their classmates, supervised by the teacher, as well as by the student. | Assesses through different techniques and instruments such as: official and auxiliary records of assessment, observation, oral tests, written tests, assessment sheets, checklists, review of notebooks, active participation, individual works, collection of anecdotes, agenda, application sheets, group works, interaction with students, context and materials, which are controlled by the teacher and the student himself/herself. | In the interview, observation, and documentary analysis, oral and written tests, presentations of students, and group works that allow them to argue and interact are assessed. | In the interview, observation, and documentary analysis, the teacher uses as assessment techniques and instruments oral tests, written tests, presentations of students, group works that allow them to argue and interact between students and teachers, records of official and auxiliary assessments of the teacher, checklist, review of notebooks, individual works, collection of anecdotes, agenda, interaction with students, in the context and materials controlled by the teacher and the student himself/herself. |
| Moments of assessment                 | The teacher assesses at all times and on an ongoing basis; she   | The teacher assesses the process of teaching and learning in different moments, at the beginning by collecting previous   | It assesses in different moments of the process of teaching and learning, at the  | In the interview, observation, and documentary analysis, the teacher  | In the interview, observation, and documentary analysis, the teacher assesses   |

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|   |   |  |   |  |   |
|---|---|--|---|--|---|
|   | <p>assesses at the beginning, during the process, and at the end. Promotes the interaction between students and teacher during the learning session.</p>            | <p>knowledge, during classes by means of oral participation through presentations, and, at the end by conducting a meta-evaluation and feedback of what was taught in class.</p> | <p>beginning by permanent motivation about the whole learning session, during the process of learning construction, and the end of the class by metacognition: What did I learn? What difficulties did I face? How did it go? What should I do to improve? By self-assessment, coevaluation and heteroevaluation, quarterly and annually.</p> | <p>assesses on an ongoing basis during the process of teaching and learning.</p>   | <p>in different moments the process of teaching and learning and conducts a diagnostic assessment during the process and final. At the beginning, she collects previous knowledge, during the development of the learning session, oral participation of students is promoted, at the end, there are presentations, and meta-evaluation and feedback of what was taught in class are conducted.</p> |
| <p>People in charge of the assessment</p> | <p>The teacher states that all parties involved in education are people in charge of the assessment. In principle, we have the teacher and the student, without</p> | <p>The person in charge of the assessment is essentially the teacher and the student himself/herself, and between students.</p>  | <p>Assessed by the teacher and students during the whole process of teaching and learning. At the same time, promotes participation of parents, and the academic sub-directorate</p>  | <p>During the observation, interview, and documentary analysis, they agree that the person in charge of the assessment is the teacher, but also consider the</p> | <p>During the interview, observation, and documentary analysis, the person in charge of assessing learning is the teacher, the student herself/himself, and the parents; the academic sub-directorate participates at</p>   |

|         |   |  |  |  |   |
|---------|---|--|--|--|---|
|         | disregarding the participation of parents.  |  | participates at the end of each academic quarter.  | managers of the educational institution.   | the end of each academic quarter.   |
| Grading | The teacher performs mainly a qualitative assessment of the context; she considers the qualities and capacities of the student. | There are symbols in the auxiliary record; however, there is also an assessment on a scale of 20 (from 0 to 20). | The grading scale in primary school is literal and descriptive (AD, A, B, C); the equivalence is: AD (17 to 20), A (13 to 16), B (11 to 12) and C (0 to 10). | During the interview and documentary analysis, assessment is qualitative, literal, and descriptive. During the observation, a quantitative assessment is seen. | We can conclude that in the observation sheet a quantitative assessment prevails, in the interview, the teacher argues to have a qualitative assessment, and, in the documentary analysis, a literal and descriptive grading takes place. |

**Table 8**

*Consolidation of implicit theories in the teacher with respect to implicit theories and categories of learning assessment*

| A priori categories | Concept, function |   |   | Assessment criteria |   |   | Assessment techniques and instruments |   |   | Moments of assessment |   |   | People in charge of the assessment |   |   | Grading |   |   |
|---------------------|-------------------|---|---|---------------------|---|---|---------------------------------------|---|---|-----------------------|---|---|------------------------------------|---|---|---------|---|---|
|                     | I                 | O | D | I                   | O | D | I                                     | O | D | I                     | O | D | I                                  | O | D | I       | O | D |
| Teacher             | D                 | D | C | D                   | I | C | D                                     | D | C | D                     | I | C | DI                                 | I | C | D       | D | C |
|                     | T                 | T | T | T                   | T | T | T                                     | T | T | T                     | T | T | T                                  | T | T | T       | T | T |

Source: Own development.

I=Guide for interview

DIT=Direct and interpretive theory

O=Guide for observation

ICT=Interpretive and constructivist theory

D=Sheet of documentary analysis

DT=Direct theory

IT= Interpretive theory

CT=constructivist theory

Next, we present the theoretical model (substantive theory) obtained from the category system reflecting the assessment practice developed by the teacher, regarding the concept-

function of assessment. The result of the content taught is assessed to qualify the student's teaching-learning process, obtaining a final assessment. By connecting conditions, processes, and results in a relatively linear way, the teacher seeks as the result of the assessment appropriation of the content and/or model by the student that is as good and stable as possible. Simultaneously, in the document analysis, we can see that the teacher performs an interactive assessment to make judgments and decisions with the students, despite trying to meet the goals of the Peruvian National Education Project and the Annual Curriculum Program.

Regarding the assessment criteria, the teacher states that she assesses the content, skills, and attitudes that allow her to reflect on different situations of reality. However, when her learning session is observed, the teacher assesses the contents planned for the teaching unit. Additionally, it is observed that students develop knowledge by interacting with their classmates, commenting, and reflecting on problem solving. In contrast, in the document analysis, a formative assessment is observed through the construction, production, and creation of knowledge, in situations of interaction and reflection through different scenarios.

As for the assessment techniques and instruments, she uses oral and written tests, student presentations, group work that promotes discussions and interpretation, official and auxiliary assessment records, checklists, reviewing notebooks, individual work, collecting anecdotes, and the school planner.

The teacher also performs the assessment at different times in the learning process. At the beginning, she collects background knowledge. As the learning session progresses, she promotes oral intervention. At the end of the class, meta-assessments and comments are used. As for the people in charge of the assessment, both during the interview and in the observation and document analysis, the persons in charge of assessing learning are the teacher, the student, and the parents. The academic deputy director participates at the end of each academic quarter. Finally, regarding the rating of the assessment, the predominant type of classification is the one based on (qualitative) criteria. In elementary school, the grade is literal and descriptive (AD, A, B, C) to express outstanding achievements and accomplishments during the process and at the beginning. However, in a parallel column, we provide a rating on a scale from 0 to 20.

Contrasting the substantive theory with the formal theory, we discovered, based on Pozo's classification (2006), the presence of the constructivist theory with features of the interpretative theory in the teacher, regarding the concept – function of the assessment is framed in the constructivist interpretative theory, constructivist interpretative theory in the assessment criteria, constructivist theory in the assessment techniques and instruments, constructivist theory in the assessment moments, constructivist theory and cognitive theory in the subjects responsible for the assessment and its qualification – constructivist perspective.

According to Pozo (2006), interpretive theory evaluates the results of the contents and/or models taught after the student performs mental processes such as discovering, remembering, connecting, specifying, and discarding. Additionally, in the constructivist theory, assessment is constant and metacognitive processes are promoted at all times - characterized precisely by this interaction of different people as part of a learning system.

## Discussion

The qualitative study was conducted using the grounded theory method on the implicit theories in the academic assessment practices carried out by a Peruvian primary school teacher. The study provided evidence on direct and occasionally contradictory relationships between certain theoretical and/or epistemological positions and school education in Puno. The analysis of the qualitative data allows us to confirm that in the performance of the teacher studied, traits of the constructive and interpretive theory prevail (Pozo, 2006) regarding the didactic

development of the learning session, roles to be fulfilled, function and criteria of the assessment, techniques and instruments, and grading scale.

This result agrees, in part, with what was found by Errázuriz-Cruz (2020) in students and teachers of Pedagogy in Chile, which demonstrates how the professional training of educators has had little significant impact on the transformation of their implicit theories about writing since it is not often perceived as a tool with which to develop or manage knowledge. In contrast, it is considered a way to unilaterally transmit knowledge from specialists to beginners or the inexperienced. In this sense, an implicit transmissional theory like this one also shows the persistence of conceptions coming from school instruction.

A similar trend is observed in Navarrete et al. (2020) in high school students in Spain, where preconceived ideas restricted artistic education to manual tasks of innate talent, so the gradual implementation of active teaching methodologies such as project-based learning (PBL) was seen as appropriate. In this regard, the evidence confirms the theory, that is, implicit theories as a type of knowledge resulting from unconscious learning produced based on personal and collective experiences that condition their decisions (Karlen et al., 2019). These ideas must also be identified by the teacher when assessing the actual level and the potential level of their students.

In line with our results, the mixed research by Rojas Romero (2013) confirms the weight of critical theory (linked to constructivism) in the assessment of secondary school students. However, this is not extensible to other areas such as IT education, largely due to knowledge and technology gaps. Here, at least explicitly, the assessment is usually traditional (Huaman, 2020). This would confirm that, despite epistemological coherence, teachers are pragmatic in the classroom, which differs in part from our results.

The main limitation of this study is that we prioritize the use of an innovative methodology over the sample size. That said, the generalization of the results must be considered with great caution: in qualitative research, it is not easy to extend the conclusions of a study without considering the context (Maxwell & Chmiel, 2014). For this reason, we recommend comparing our locally focused discussion with other studies. We do not believe we have the last word on the differences at the national level either. Our results should be compared with various studies from other publications and national regions. Finally, incorporating Latin American theses and articles in systematic reviews and synthesis of quantitative literature is now an accepted practice (Hartling et al., 2017).

Peru ranks in one of the last places when it comes to investment in primary education in Latin America, and one of the last places in the PISA test. This study has rudimentary but important implications for the national curriculum. Often criticized for their monotony, policies would be more efficient if decision-makers were informed of the psychological implications of assessment practices that accommodate teachers' beliefs better (for example, invest less in materials and more in group management training). However, the study is of particular interest to teachers and their unions, since it highlights achievements but also warns of some difficulties whose approach is intersectoral and interdisciplinary.

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