International Journal of Educational Research 94 (2019) 90–99

Contents lists available at ScienceDirect

International Journal of Educational Research

journal homepage: www.elsevier.com/locate/ijedures

Pre-service teachers' appreciations of teacher-educators' strategies when learning about narratives

Harold Castañeda-Peña*, Dora Inés Calderón, Miriam Borja, Sandra Patricia Quitián, Adriana Yamile Suárez

Universidad Distrital Francisco José de Caldas, Colombia

ARTICLE INFO

Keywords:
Didactic strategy
Teacher education
Narrative

ABSTRACT

This paper focuses on teacher-educators' didactic strategies as noticed and valued by their students or pre-service teachers who will be teachers in the future. Little has been explored in teacher education relating to the interphase narrative content and teachers' didactic strategies. Two didactic learning environments about narrative content were implemented correspondingly within two courses, and they were assessed by 45 participating pre-service teachers using assessment questionnaires. The population sample came from six teacher education programs at the undergraduate level. Based on the assessment made by the pre-service teachers in the two courses, an analysis of differences between the evaluated items using the chi-square test was performed. Results indicate that there are significant correlations between Bachelor of Education (B.Ed.) Programs and didactic strategies, the pre-service teachers' semester and such strategies and between strategies themselves. Thus, it appears important to clearly reify the didactic design components, such as the didactic strategies, as contributors to the didactic design with differentiated didactic functions and roles in learning processes. Additionally, findings tend to reflect that the didactic strategy is on its own a didactic answer to the pedagogical challenges teacher-educators identified to teach narrative content. Finally, it seems paramount to revisit and to ascertain the conceptualization of didactic strategies within the field of didactics.

1. Introduction

This paper reports findings of the research project "Didactic and technological development in didactic scenarios for the education of teachers who welcome diversity: factors for its implementation and validation at UDFJC (Universidad Distrital Francisco José de Caldas (Bogotá-Colombia)," which was carried out with language and communication teacher-educators (hereinafter teachers). The project sought to validate the hypothetical learning trajectories (HLTs – hereinafter trajectories) designed by the language and communication teachers in didactic environments as used to educate pre-service teachers coming from different B.Ed. programs.

The project merged two approaches. The first was design science research. The second was communities of practice (CoP) methodology. Design science research was used in designing, implementing and validating didactic learning environments within the context of language and communication teachers' professional development. Therefore, design science research was adopted as an epistemological perspective for language and communication didactics. The theme used for language and communication teachers' professional development was narrative (Ricoeur, 1984, 1988; Calderón et al., 2014), and this paper focuses on teachers' didactic

* Corresponding author at: Universidad Distrital Francisco José de Caldas, Calle 13 No. 31 - 75 Edificio de Investigadores, Segundo Piso, Bogotá, Colombia.

E-mail address: hacastanedap@udistrital.edu.co (H. Castañeda-Peña).

https://doi.org/10.1016/j.ijer.2018.10.009
Received 20 March 2018; Received in revised form 29 October 2018; Accepted 31 October 2018
Available online 21 December 2018

strategies as noticed and valued by their students or pre-service teachers who will be teachers in the future (hereinafter students). The didactic design is conceived of as the articulating system of the learning purposes, the selected contents, the strategies for teaching, the resources, the mediations and the evaluation strategies. All the previous ones designed by the teacher to favor learning processes in a specific curricular perspective. In its didactic device dimension, the design is the tool that the teacher can apply to promote learnings and at the same time to monitor such process. The didactic design is subject to evaluation and transformation as a device. CoP (Wenger, 1998) was used as a methodological framework to guide meaning interpretation and research practices and processes truly constituting a research community of practice.

Findings identify aspects of didactic learning environments as perceived by the teachers' students. Central to the students' appreciations are insights about the teachers' didactic strategies, which will be the focus of this report.

1.1. Learning about narratives

To help teachers develop professionally, in the narrative theme, constitutes a pedagogical and didactic principle for teacher education in and for diversity (Calderón et al., 2014). Therefore, there is an acknowledged need to develop students' own narrative competencies and narrative didactic. This is because narrating is one of the most important discursive experiences in one's own life, especially in the life of children. According to Bruner (2004) (as cited in Calderón et al., 2014) narratives situate experiences in time and place, making salient human intentions, actions and vicissitudes. In the same line of argument, narratives are forms of thought and discourse that could guarantee social participation, comprehension, imagination and identity development at individual and collective levels, making it possible to apprehend social and school knowledge.

1.2. The didactic act: hypothetical learning trajectories and didactic strategies

In accordance with design science research (Cobb & Gravemeijer, 2008; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003), as a research team we adopted the design systemic cycles as a foundation for creating narrative didactic learning environments for teachers who developed trajectories (Clements & Sarama, 2007) to teach narrative content to students.

Broadly speaking, a trajectory is made out of an articulated goal-oriented system that foresees how narrative learning might occur. This system consists of hypotheses about the learning processes that learners will develop about a specific theme (e.g. narratives) and about the tasks to be used in promoting such learning.

It is in such a system that the objectives planned by the teacher become an axis for the other system components: the tasks (e.g. cognitive challenges for the students) and the hypotheses about the students' learning processes work interdependently, affecting each other. This is the reason why the design cycle requires firstly identifying problems (educational challenges) that guide the establishment of learning goals; secondly, a theoretical foundation is needed to guide the design proposal, the observation of its evolution and evaluation; thirdly, it is expected that the design cycle produces, after its implementation, didactic theory (e.g. narrative didactic theory for the language and communication educational field).

Both designed tasks and didactic strategies (methodological procedures to develop tasks) work together specifically to foster content learnings as designed. Tasks and didactic strategies also contribute with assessment elements to value learning outcomes; this is why they are interdependent and not only articulated to the hypotheses about learning progress, but also to materials and to the pedagogical use of mediations to perform activities.

Thus, in the evolution of any trajectory, students experience mainly tasks and didactic strategies. Tasks refer to activities designed to be solved by students. It is in this process of task development where the learning process may occur as planned. The didactic strategies configure the devices designed to carry out the teaching actions that realize the teachers' trajectories. Therefore, the didactic strategies self-design their own constitutive elements, which include procedures, activities or tasks, sources and assessment strategies. These elements are arranged and organized in a work plan that supports processes of learning previously identified as factors for learning specific content. Such factors carry out a learning approach and a methodology for its development. Thus, the didactic strategies articulate, develop or activate learning strategies. According to the didactic strategies' structure and dynamics, participants' roles (students and teachers) are defined, as well as forms of communicative interaction and criteria for carrying out the tasks. Therefore, the didactic strategies have the explicit function of promoting the learning of specific content defined in the design. The didactic strategies provide the elements for results assessment, hence their articulation and interdependence with the hypotheses raised on the progression of learning and with the set of materials and mediations selected to carry out the planned activities.

Assessment, seen here as the act of valuing the didactic experience, refers to the action of appreciating, valuing with the senses, the "determination or approximation to the value of a thing" and to observing in order to "reject, modify or improve a situation or a proposal." (DRAE – Diccionario de la Real Academia de la Lengua (Spanish Royal Academy Dictionary)). In our work, we contend that the assessment process is linked to the students' appreciation in the anthropological and cultural perspective, where a particular vision of the world is manifested (Vargas, 1994). Assessment also turns learning experiences into a focus on reflection. Such reflection involves judgements and recognition according to the particular vision of the participants' experience: in this case, in a specific didactic learning environment. The result of an assessment act is a set of qualifications and attributes that make it possible to establish comprehension levels in didactic research as well as content development, categories and relationships established by the users (in this case, the students) and their role in the expected learning in a didactic learning environment.

1.3. Taking stock of narrative education for diversity and inclusion: the role of strategies

Scholarly work on narrative education for diversity and inclusion seems to be scarce. Skouge and Rao (2009) illustrate an educational experience of students (e.g. pre-service teachers) on narrative using mass media and technology. It is claimed that telling stories is an important part of teachers' communicative repertoire, as this gives them sources to express experiences and explore ideas. Students learn about value construction, which is important for their future work with special education students. Students deal with digital story-telling and use myriad sources to retell stories coming from different traditions. In order to do this, they use multimedia, as well as visual and audio sources. It is hoped that participants will identify new ways of communication to share experiences.

Huber, Caine, Huber, and Steeves (2013) highlight the importance and potential of story-telling, interaction and knowledge development at school through narratives. These narratives might help make sense of one's own life by changing it or by favoring a different future full of hope. Narrative inquiry as pedagogy is transformative. This is an extraordinary pedagogy that is useful in any educational institution, including that of disabled students. Teachers' roles include seeking out stories and transforming lives. It is necessary for teachers (North American in this case) to recognize the ethical value of narrative content, as this value constitutes the narrative on its own.

Calderón et al. (2014) articulate a procedure for didactic sequence production. They propose the development of narrative inquiry in teacher education for future teachers who will work in the first stages of primary education where diversity is identifiable. In this sense, narrative inquiry is a central theme for the education of a discursive subject in the field of language and communication. It is recommended that students, on one side, be educated in the different narrative dimensions. On the other side, it seems important to include aspects related to cognitive, physical, sociocultural, sensory and linguistic diversity of students' narrative knowledging and lived experiences.

The literature commented on here highlights the important place of narrative inquiry for the new generations of pre-service teachers. These texts acknowledge the fundamental value of narrative in the (re)constitution of life experiences. In that sense, it appears important to incorporate pedagogies and didactics into teacher education processes, making central the narrative experience of myriad social groups and contexts. Narrative inquiry is a framework contributing to ascertain the characteristics of didactic learning environments and contexts of teacher education that welcome diversity. However, less has been explored in teacher education relating to the interphase narrative content and teaching didactic strategies.

With regard to didactic strategies, a relatively common concern in Spanish higher education is to reduce the number of failing students, and it is recognized that achieving better performance requires a change in the teaching methods used. Therefore, a blended didactic strategy (as mediation) was implemented. It was found that students did improve their learning experience and perceived the benefit obtained, as well as how their motivation was strengthened and the degree of satisfaction achieved. Teachers' roles were stressed as they "encouraged the performance of online activities, highlighting the objectives of this approach and its relation to (face to face) lessons" (Lopez-Perez, Perez-Lopez, & Rodriguez-Ariza, 2011). Fay, Garrod, and Carletta (2000) reflect on group work as a didactic strategy that, when implemented, is broadly understood as group communication. Types of groups definitely impact on the type of communication that is developed. Greene, Hutchinson, Costa, and Crompton (2012) claim that "a clear and accurate task definition enables students to choose appropriate learning strategies, formulate standards against which to monitor the execution of strategies, and make effective metacognitive judgments regarding future performance" (p. 130). Armellini and Aiyegbayo (2010) used e-tivities as part of a didactic strategy that facilitated learning strategies in higher education students coming from different academic disciplines (media studies, psychology, inter-professional education in four universities in the United Kingdom). The didactic strategy was realized using innovative assessment designs online, which included individual and online workshops. As is evident, there is a need to research not simply learning strategies (mostly favored by specialized research), but also the didactic strategies used by language and communication teachers who are responsible for the narrative formation of students coming from different B.Ed. programs (e.g. mathematics, humanities, etc.)

1.4. Research question and objectives

Within the context of assessment and validation, the analysis presented in this paper corresponds to the way students experienced narrative didactic learning environments. Participating students stated their appreciation for the didactic strategies employed by their teachers in the didactic learning environments. Thus, the study asks about students' appreciations of the didactic strategies employed by their teachers to promote narrative learning. The study seeks to analyze students' noticing and appreciating of the teachers' didactic strategies.

2. Method

2.1. Didactic design: two higher education courses on narratives

The research team (e.g. CALE: This is our research Community of Practice (CoP) where CALE stands for Comunidad de Apredizaje del Lenguaje ("Language Learning Community (LangLeCo)" for the English translation)) worked on a didactic design to validate narrative didactic learning environments and Virtual Learning Objects (VLOs) based on design science research (Garello, Rinaudo, & Donolo, 2011). It was hoped that this would pave the way for a better understanding and transformation of teaching and learning practices in professional development programs of language and communication teachers, who face myriad and diverse contexts in

the lifeworld. The end result was a language and communication teachers' professional development course named "Seminar for Teachers of Language and Communication – 'Didactics of the narrative for the education of teachers who welcome diversity'". The course aimed to support participants' reflections on narrative didactics and its relationship with the use of technology and the welcoming of diversity. Hence, this teachers' seminar is based on a theoretical and empirical analysis carried out jointly, discussed by all the participants according to their knowledge and fields of action. Each researcher contributes to the understanding of the complexity of the research problem and of the particularities of the specific tasks. Thus, participants generate not only conceptual corridors, but also spaces for action and mobilization. Then, essentially trajectories are designed and validated through application, design observation and redesign. This process constitutes a spiral that allows growth and progress in the understanding of the phenomena of teaching language and communication for diversity and, in particular, in understanding the functioning of didactic learning environments (Calderón et al., 2014, p.16).

As a result of this, participant teachers created their own didactic learning environments (These didactic learning environments are available at the platform Atutor, at this link: http://alternativatutor.udistrital.edu.co/ATutor/index.php). This paper's data come from two of them: "Teacher education for special educational needs students" and "Communication and interaction in school contexts." The first didactic learning environment is also part of a transversal project at UDFJC where language is understood as a human faculty (e.g. Echeverría, 1996; Vigotsky, 1982). Thus, this first didactic learning environment reflects on the role of language as a configurator of human communication based on differences, social and cultural agreements and disagreements which constitute diversity. In that sense, this didactic learning environment educates about diverse communities with an emphasis on cognitive, physical and sensory disabilities and on ethnic groups (mainly, indigenous communities). The second didactic learning environment is part of the B.Ed. in Humanities and Spanish Language at UDFJC. This didactic learning environment revolved around the comprehension of the schools' own discursive practices where the relationships with the self, the other and knowledge are questioned. This didactic learning environment emphasized gender and conflict as a specific theme aiming to look into different communicative devices used to construct gender diversity. Thus, language and communication teachers' own possibility of constructing their didactic designs allowed them to start the process of refinement of their teaching practices. This is a milestone, as not only is it possible to know the processes that facilitate the construction of knowledge, but also to study systematically the practices of language and communication narrative teaching.

2.2. Research design

De Benito and Salinas (2016) claim that design science research is genuinely a type of research that seeks to ascertain innovation in education as a mechanism to solve educational problems and foster transformations in situated contexts. In this line of thought, design science research allows the construction of theoretical models on learning thanks to the refinement of artifacts involved in the research process. This study ascribes to design science research because the methodological approach, as explained by Rinaudo and Donolo (2010), allows for the understanding of the relationships established between the educational theory, the designed artifacts and the practices.

Thus, design science research is a methodological paradigm that is key to research teaching and learning because it "has the potential to advance learning and teaching theories in complex situations and leads to empirically grounded knowledge, which is useful in making instructional decisions aimed at promoting and enhancing student learning" (Molina, Castro, Molina, & Castro, 2011, p. 76). Consequently, the appreciations that students construct for particular forms of learning, particular teaching tools and didactic strategies are the interest of this report.

2.3. Participants

The design science research process starts off with the characterization of a complex teaching-learning situation, where the experiment goals are established. This means that courses are designed along with their variables (theme/environment), and participants (e.g. types of students) are chosen. As described above, for the purposes of this report, two didactic learning environments were implemented and they were assessed by 45 students, who make up the total of the students taking such courses. The distribution of the population sample comes from six teacher education programs at the undergraduate level, as shown in Table 1.

Table 2 illustrates some of the course characteristics related to the pre-service teachers, taking them as part of their teaching degree.

The set of elements as participants, themes, types of students and teaching strategies are constitutive of the learning environment. Due to the interest of this research study, the focus of analysis was the didactic strategy and its impact on the students' learnings. Therefore, what the students valued was the didactic strategy which became relevant through the instruments built for that purpose.

Table 1
Distribution of the population sample (B.Ed. Programs).

B.Ed. in Biology	B.Ed. in Social Science	B.Ed. in Physics	B.Ed. in Humanities and Spanish Language	B.Ed. in Mathematics	B.Ed. in Chemistry	Total Participants
2	3	2	29	2	7	45

Table 2
Course characteristics.

Course	Type of course according to B.Ed. program	Total students	Length
Teacher education for special educational needs students	Core foundational course	25	4 weeks
Communication and interaction in school contexts	Major course	20	4 weeks (6 hours per week)

2.4. Data collection and procedures

Methodologically, design science research is based on complex experiments where variables and levels work together and where processes are reiterated until goals are achieved. This implies constant participant mediation. The instruments used by the students to assess teachers' didactic strategies when teaching narratives were essentially qualitative. However, data analysis was also possible through the understanding of quantitative frequencies of the assessment as expressed by the participant students. The first instrument was an assessment questionnaire filled in by expert judges who observed the course designs. The second instrument was an assessment questionnaire answered by the 45 participating students.

Content validity was achieved in the first instrument through the coefficient $^{a}_{WG}$ that tested the trustworthiness of the judges' answers for all the items used to assess the didactic strategies. To calculate this, Brown, Hauenstein's (2005) formula was used:

$$a_{WG} = 1 - \frac{2^{*}S_X^2}{[(H + L)^{*}\overline{X} - \overline{X}^2 - (H^{*}L)]^{*}[J/(J-1)]}$$

Table 3 shows the degree of agreement between judges with the scale proposed by Landis and Koch (1977) used in the classic Cohen *kappa* that belongs to the same family of the coefficient $^{a}_{WG}$.

Based on the assessment made by the students in the two courses, an analysis of differences between the evaluated items using the chi-square test was performed. To do this, we bore in mind the main associations between the evaluated items by the students with a probability value $p = < 0.05$ (CI = > 75%) and with positive and negative values equal or greater than 2 of the corrected residues/marginal rows, expressing the magnitude of the association between pairs of categories. Additionally, only those significant relationships that have at least 75% of valid cases (n = 34) were included in the analysis below.

3. Results

3.1. Correlations between B.Ed. program and didactic strategies

There were four didactic strategies that correlated significantly: workshops, group work, lectures and oral reports. For the communicative purposes of this article, workshops will be named strategy 1, group work will be named strategy 2, lectures will be named strategy 3 and oral reports will be named strategy 4. Table 4 shows the significant correlations in the different B.Ed. programs.

As illustrated in Table 4, in the B.Ed. in Physics program, more students than expected value the usefulness of the materials used for their narrative learning on a medium scale.

Significantly, more B.Ed. in Chemistry students than expected valued as "low" the usefulness of materials for learning. Critically, they also indicated that the effectiveness of resources used for learning about narratives was low. The statistical test also showed that students of this program considered that strategy 3 for learning narrative themes was excellent. Apart from this last slight discordance of appreciation, it could be argued that in general, Chemistry students appear to have a negative assessment of the strategies – but this should be treated with the utmost caution.

The evidence suggests that more students than expected coming from the B.Ed. in Humanities and Spanish Language consider that the activities developed in the classroom facilitated the learning of narrative topics. This finding is in line with the positive assessment these Humanities and Spanish Language students gave to strategies 2 and 3. In contrast, strategy 4 was valued as "low" in terms of its effectiveness.

More students than expected from the B.Ed. in Mathematics considered that the activities developed in class did not facilitate their narrative learning. They also valued the effectiveness of strategies 1, 2, 3 as "low" for learning about narratives. This appears to be corroborated, as this group of students rated as "low" the effectiveness of the resources identified for learning about narratives.

Table 3
Degree of agreement between judges - Coefficient $^{a}_{WG}$.

Kappa coefficient	Degree of agreement
0.00	Poor agreement
0.01 – 0.20	Very light agreement
0.21 – 0.40	Acceptable agreement
0.41 – 0.60	Moderate agreement
0.61 – 0.80	Considerable agreement
0.81 – 1.00	Almost perfect agreement

Table 4
Significant correlations (B.Ed. programs).

Assessment questionnaire item	Main associations between categories	Marginal row totals
Rate the usefulness of these materials for your learning	Physics*Medium	2.4
	Chemistry*Low	3.4
The activities developed in the class facilitate the learning of narratives for the course	Humanities*No	−2.4
	Humanities*Yes	2.4
	Mathematics*No	5.4
	Mathematics*Yes	−5.4
According to the previous answer, assess the effectiveness of the strategies for narrative learning (Strategy 1)	Social science*Acceptable	2.1
	Social science*Good	−2.2
	Mathematics*Low	4.6
According to the previous answer, assess the effectiveness of the strategies for narrative learning (Strategy 2)	Biology*Excellent	2.0
	Humanities*Low	−2.0
	Mathematics*Low	6.6
According to the previous answer, assess the effectiveness of the strategies for narrative learning (Strategy 4)	Humanities*Low	−2.2
	Mathematics*Low	6.0
According to the previous answer, assess the effectiveness of the strategies for narrative learning that favor class participation (Strategy 3)	Biology*Acceptable	3.7
	Social science*Low	3.4
	Social science*Good	−2.0
Of the strategies that you identified which you consider to have favored the learning of the narrative during the class (Strategy 3)	Biology*Low	2.2
	Humanities*Low	−2.1
	Humanities*Excellent	2.3
	Mathematics*Low	4.8
	Chemistry*Excellent	−2.1
Rate the effectiveness of the resources identified for your learning about the narrative	Humanities*Low	−2.4
	Mathematics*Low	2.5
	Chemistry*Low	2.5
	Chemistry*Medium	−2.2

More students than expected from the B.Ed. in Social Science program agreed on rating as “acceptable” the effectiveness of strategy 1 and as “low” the way strategy 3 favored classroom participation.

Finally, more students than expected from the B.Ed. in Biology program shared the idea that strategy 2 is excellent to learn about narratives. They also think that strategy 3 is acceptable as a tool to promote classroom participation, and they valued a narrative learning promoter as “low.”

3.2. Correlations between students’ semester and didactic strategies

Table 5 illustrates the correlations between students’ semester and the didactic strategies they noticed and rated.

The values in Table 5 suggest that more 5th semester students than expected considered strategy 3 as excellent to favor narrative learning during the class. This result differs from 6th semester students’ appreciation of the same strategy in relation to the promotion of class participation.

It was found that more 7th semester students than expected had a negative view of the strategies in general. A substantial agreement is also observed when this group of students believed that classroom activities do not develop narrative learning. As might have been expected, our findings show a poor appreciation of these students toward the effectiveness of strategies 1, 2 and 4 for

Table 5
Significant correlations (Students’ semesters).

Assessment questionnaire item	Main associations between categories	Marginal row totals
Classroom activities facilitate narrative learning	7 semester*No	4.3
	7 semester*Yes	−4.3
According to the previous answer, assess the effectiveness of the strategies for narrative learning (Strategy 1)	7 semester*Low	3.6
	9 semester*Excellent	2.6
According to the previous answer, assess the effectiveness of the strategies for narrative learning (Strategy 2)	7 semester*Low	5.4
	8 semester*Good	2.6
According to the previous answer, assess the effectiveness of the strategies for narrative learning (Strategy 4)	7 semester*Low	6.0
	8 semester*Good	2.1
	9 semester*Excellent	2.7
	10 semester*Good	2.4
According to the previous answer, assess the effectiveness of the strategies for narrative learning that favor class participation (Strategy 3)	6 semester*Low	3.4
	9 semester*Buena	−2.0
	10 semester*Acceptable	2.3
Of the strategies that you identified which you consider to have favored the learning of the narrative during the class (Strategy 3)	5 semester*Excellent	2.2
	7 semester*Low	3.8

Table 6
Significant correlations (didactic strategies).

Assessment questionnaire item	Main associations between categories	Marginal row totals
Strategy effectiveness for narrative learning	Strategy 1-Low*Strategy 2-Low	4.6
Strategy effectiveness for narrative learning	Strategy 1-Low*Strategy 3-Low	3.5
	Strategy 1-Excellent*Strategy 3-Excellent	3.8
Strategy effectiveness for narrative learning	Strategy 1-Low*Strategy 4-Low	4.8
Strategy effectiveness for narrative learning and classroom participation	Strategy 1-Low*Strategy 1-Low	2.1
	Strategy 1-Acceptable*Strategy 1-Acceptable	2.3
	Strategy 1-Good*Strategy 1-Good	2.4
	Strategy 1-Excellent*Strategy 1-Excellent	3.1
Strategy effectiveness for narrative learning and classroom participation	Strategy 1-Acceptable*Strategy 3-Low	2.1
	Strategy 1-Good*Strategy 3-Acceptable	2.1
	Strategy 1-Excellent*Strategy 3-Excellent	3.7
Strategy effectiveness for narrative learning and strategies that have favored the learning of the narrative during the class	Strategy 1-Low*Strategy 1-Low	4.6
	Strategy 1-Good*Strategy 1-Good	3.0
	Strategy 1-Excellent*Strategy 1-Excellent	4.4
Strategy effectiveness for narrative learning and strategies that have favored the learning of the narrative during the class	Strategy 1-Low*Strategy 3-Low	3.8
	Strategy 1-Good*Strategy 3-Good	3.0

narrative learning. A noteworthy adverse coincidence was found in their appreciation of strategy 3, as it was rated “low” as a tool to promote narrative learning during class.

In contrast to the 7th semester students’ appreciations, it was found that more 8th semester students than expected valued as “good” the effectiveness of strategies 2 and 4 for narrative learning. This positive value is in agreement with the 9th semester students’ appreciations for strategies 1 and 4, which were rated as excellent. Despite this fact, more 9th semester students than expected do not rate strategy 3 as “good” as a mechanism to promote classroom participation.

The research data indicate that more 10th semester students than expected rated as “good” strategy 4 as a didactic strategy that is effective promoting narrative learning. Although for this group, strategy 3 is acceptable to guarantee classroom participation.

3.3. Correlations between didactic strategies

Table 6 illustrates the significant correlations between didactic strategies.

As shown in Table 6, the analysis reveals that strategy effectiveness for narrative learning is a salient correlated aspect in the data set. More students than expected valued strategy 1 differently in correlation to other strategies: The correlation between strategy 1 and strategies 2, 3 and 4 is worth noting. For example, when students where asked about the effectiveness for narrative learning of strategy 1, they rated it as “low,” and the same rate was given to strategies 2, 3 and 4. However, the single most striking observation to emerge from the data correlation in relation to the effectiveness of strategies for narrative learning was that when strategy 1 was rated as excellent, more students than expected also rated strategy 3 as excellent.

Overall, our results show that when more students than expected rated strategy 1 effectiveness for narrative learning as either “low,” “acceptable,” “good” or “excellent,” they also rated correspondingly its appreciation of the same strategy in relation to the promotion of class participation. Curiously, this correlation (e.g. strategy effectiveness for narrative learning and strategy promotion of classroom participation) behaves differently when strategy 1 is correlated to other strategies. For example, it was found that when more students than expected rated the effectiveness of strategy 1 for narrative learning as “acceptable,” more students than expected valued the promotion of classroom participation of strategy 3 as “low.” Importantly, when the promotion of narrative learning of strategy 1 was valued as “good,” the promotion of classroom participation of strategy 3 was valued as “low.” It was striking to find that the correlation between strategy 1 and strategy 3 changed when both were rated as “excellent.” This means that when more students than expected valued the effectiveness for narrative learning of strategy 1 as “excellent,” then more students than expected also value the promotion of classroom participation of strategy 3 as “excellent.” In our view, these results emphasize the subjective character of the students’ general appreciation of the didactic strategies they were able to perceive while learning narrative themes in class.

Finally, the correlation between the effectiveness of the strategies for narrative learning and their usefulness in favoring the learning of the narrative theme during the class was significant. This is the case when these two categories are correlated either as “low,” “good” or “excellent” for strategy 1. Additionally, more students than expected who rated the effectiveness of strategy 1 for narrative learning as “low” also rated strategy 3 as “low” for its use in class time favoring narrative learning. This was also the case when these two strategies were rated as “good.”

4. Discussion

The didactic strategies explored in this study (workshops (Strategy 1), group work (Strategy 2), lectures (Strategy 3) and oral reports (Strategy 4)) appear to be traditional strategies, and this mirrors the use of blended didactic strategies as Lopez-Perez et al. (2011) argued. In this line of thought, in our experience this happens in a traditional way, but using new technologies.

Group discussions could realize different forms of didactic strategies. Therefore, group discussion size does influence the

effectiveness of communication and the perception of the didactic strategies (as was found by Fay et al. (2000)). This might have been the case in our research experience, but we do not have enough data to confirm this hypothesis.

A didactic strategy influences the realization of students' learning strategies (Greene et al., 2012), so their perception could be strongly related to the teachers' trajectory design. This is also confirmed by Armellini and Aiyegbayo (2010), whose work has discussed, in line with ours, the effects of the didactic strategy on students' appreciation when conducting workshops within blended-learning environments. Such appreciation revolves around innovation in education (e.g. students are able to notice didactic strategies being used with either face-to-face or mediated communication) and around the effects on students' learning and motivation (e.g. students were able to express judgements about the effectiveness of the didactic strategies they noticed in relation to content learning).

There are three additional aspects we would like to discuss in this section. Firstly, as design science research aims to comprehend the interrelationship between educational theory, the designed artifacts and the educational practices, it seems necessary to address the interphase between our findings, the didactic design and narrative theory. Secondly, it is central to consider the relationship between students' appreciations of strategies and the didactic strategies. Therefore, the trustworthiness of the instruments selected to collect such appreciations needs to be discussed, as well as the interphase between didactic strategies, learning and participation. Thirdly, thinking of the didactic strategies as a component of the didactic design with an effect on the didactic learning environments' assessment also deserves attention in future design science research processes.

4.1. Didactic design and narrative theory

Brown (1992), Collins (1992), Reeves, Herrington, and Oliver (2002) and, more recently, De Benito and Salinas (2016, p. 5) claim that one of the attributes of design science research as a research and design approach is precisely to carry out "rigorous studies that are also reflexive and useful in one hand to test and re-design innovative learning environments and on the other hand to set up new design principles." It is within this framework that this study sought to identify the students' appreciations of the didactic strategies planned and implemented by their teachers in the didactic learning environments designed to teach narrative content.

The effectiveness of the didactic strategies was valued significantly by 45 students, as shown in Table 1. It is important to highlight that the students valued the didactic strategies that constituted a core part of designed higher education courses where teaching narrative content was paramount. Therefore, the didactic strategy is, on its own, a didactic answer to the pedagogical challenges teachers identified before their designing. The positive correlation identified between the didactic strategy and the semester in which the students were placed at the moment of the study could be thought of as their appreciation of the pertinence that narrative content might have for initial teacher education programs, due to the myriad B.Ed. programs from which participant students came.

Additionally, in relation to narrative theory and the appreciations found, it seems that such instruments are one way to assess the actual presence and relevance of the didactic strategies seen as teaching tools that contribute to the development of the trajectories (however, see our instrument critique below).

Concerning course design, it seems remarkable that the didactic strategies addressed classroom interaction patterns that favored different students' roles and the achievement of classroom objectives through task development. It is in this way that our findings support the idea that design science research aims to discover solutions to improve student learning, as proposed by Reeves (2000), 2006) and as cited by De Benito and Salinas (2016).

4.2. Pre-service teachers' appreciations and didactic strategies

4.2.1. Collecting students' appreciations – trustworthiness

The instruments used to collect such data directly asked participating students about aspects related to their classroom experience, providing a pre-established relationship for them to measure subjectively (e.g. strategy and activities, strategy and sources). The instruments also inquired about the effect of the didactic strategy on the personal learning experience (e.g. strategy and one's own narrative learning, the potential of didactic strategies to promote one's own classroom participation). Therefore, the instruments favored answers that correlated such relationships with numerous types of appreciations according to the scales provided. Therefore, it could be inferred that there were appreciations because there were reported measurements of the correlations; the results clustered a good number of correlations according to academic program, semester and didactic strategy. This resonates with the idea that the appreciations are extremely subjective (Vargas, 1994) due to the variations reported according to, for example, the same strategy being correlated differently with diverse aspects.

This poses issues for both design science research and teacher education in general. In relation to the latter, it appears important to clearly reify the didactic design components such as the didactic strategies, the activity types, the sources, etc., as distinct elements, but also as contributors to the didactic design with differentiated didactic functions and roles in learning processes. With regards to design science research related to didactic learning environments, instrument design needs to be revisited, as designs could compromise the possibility of collecting trustworthy data to find out about the evolution of the didactic learning environment design and to favor its own enhancement.

4.2.2. Didactic strategies, learning and participation

The variance found in the students' appreciation of the didactic strategies according to semester and B.Ed. program shows that there could be an impact in the field of teacher education of the participants and in learning as their semesters of university study

progress in relation with the didactic strategy category and the narrative theme. It seems that students who belong to fields of study oriented toward basic science (e.g. mathematics, chemistry and physics) appreciate less the role of the didactic strategy in their learning of narrative themes in their education as teachers-to-be. They do, however, value more positively the role of materials. In contrast to this finding, students who undertake more humanistic fields of study (e.g. language and social studies) tend to value more positively the didactic strategies and a theme that seems closer to their area of study (e.g. narrative contents).

This puts forward the discussion about the interdependence of learning and participation mediated by didactic strategies. Even though there is a definite variance in the students' appreciations, they still reveal that for both teachers and design science research, the remaining question addresses the level of students' education on didactic topics (e.g. the appreciation fluctuates according to the correlation) due to the fact that the appreciation might also depend more on the type of classroom participation the students experience, rather than on the type of learning the didactic strategy may favor. Another unsolved issue is what specifically was valued about the narrative theme, as the instruments did not inquire into this aspect. However, the theme was valued in relation to the didactic strategies used by the teachers.

4.3. Future design science research processes

As design science research (Rinaudo & Donolo, 2010) and the trajectory theory propose (Clements & Sarama, 2007), the didactic design puts together fundamental challenges identified in relation to learning, learning goals and task design. Within this framework, the didactic strategies become an articulating component: They are the device that realizes the didactic relationship of teaching and learning.

The data collection instruments used in this study addressed the didactic strategies-effectiveness in relation to learning and didactic strategies-effectiveness in relation to classroom participation. The results showed students' appreciations correlating types of activities and materials, types of activities and participation and types of activities and narrative themes. Likewise, the didactic strategies that the participant students identified included among others workshops, lectures, group work, etc. However, they did name others that could not be conceptually be seen as didactic strategies, but rather, as activities or classroom artifacts that are also part of the didactic learning environment (e.g. quiz, video).

This suggests that we need to further ascertain the conceptualization of didactic strategy within the field of didactics. As shown before, there are authors conceptualizing didactic strategies differently (e.g. as devices, methods, guidelines, activities, learning processes, etc.) (see Salinas, 1997; Herrera, 2004; Calderón, 2016). It seems necessary to revisit this analytical category in design science research due to its central role in the didactic design and development of didactic learning environments, clarifying its meaning, function and characteristics. In the same line of thought, it seems important to make more explicit for students the presence and use of the didactic strategies and their learning role as part of the didactic learning environments.

This could probably foster in students not only skills to identify the didactic strategies used by their teachers, but skills of monitoring their own learning process mediated by didactic strategies, adopted as part of their own task development and learning.

As a synthesis of the three previous aspects, the results allow us to argue that design-based research requires focusing on the most observable aspects in order to, from them, approach to understand the less tangible aspects that reveal the dynamics of a didactic design: in this case the didactic strategies. Finally, in relation to the narrative instruction of the future teachers, we can conclude that it is not about the narrative in disciplinary terms, but about the design, implementation and evaluation of didactic designs put in place in learning environments that favor narrative expression in all contexts.

Acknowledgements

Research Project sponsored by the Administrative Department of Science, Technology and Innovation (COLCIENCIAS), ID 661 (2014), developed as part of the research program "Pedagogical and Technological Architecture for Teacher Education in and for Diversity" of the AIDETC consortium: Alliance of Institutions for the Development of Education and Technology in Colombia, also sponsored by COLCIENCIAS ID FP44842-546-2014 (2014-0401 COLCIENCIAS) and led by UDFJC.

References

Armellini, A., & Aiyegbayo, O. (2010). Learning design and assessment with e-tivities. *British Journal of Educational Technology, 41*(6), 922–935.

Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. *Journal of the Learning Sciences, 2*(2), 141–178.

Bruner, J. (2004). *"Dos modalidades de pensamiento" ["Two modes of thought]. Realidad mental y mundos posibles [Actual minds, possible worlds]* Barcelona Gedisa.

Brown, R. D., Hauenstein, N., & M, A. (2005). Interrater agreement reconsidered: An alternative to the r_{WG} indices. *Organizational Research Methods, 8*, 165–184.

Calderón, D., Soler, S., Borja, M., Muñoz, G., Rojas, G., Medina, G., et al. (2014). *Referentes curriculares con incorporación de tecnologías para la formación del profesorado de lenguaje y comunicación en y para la diversidad* (2ª edición). Bogotá: Universidad Distrital Francisco José de Caldas.

Calderón, D. (2016). *El MVA-N en la Comunidad de Lenguaje y Educación: Modelo de validación ALTER-NATIVA de objetos virtuales de aprendizaje en escenarios naturales.* Bogotá: Universidad Distrital Francico José de Caldas.

Cobb, P., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiments in educational research. *Educational Researcher, 32*(1), 9–13.

Clements, D., & Sarama, J. (2007). Effects of a preschool mathematics curriculum: Summative research on the Building blocks project. *Journal for Research in Mathematics Education, 38*, 136–163.

Cobb, P., & Gravemeijer, K. (2008). Experimenting to support and understand learning processes. In A. E. Kelly, R. A. Lesh, & J. Y. Baek (Eds.). *Handbook of design research methods in education: innovations in science, technology, engineering, and mathematics learning and teaching* (pp. 68–95). .

Collins, A. (1992). *Toward a design science of education. New directions in educational technology*. Berlin, Heidelberg: Springer15–22.

De Benito, C. B., & Salinas, I. J. M. S. (2016). *La investigación basada en diseño en Tecnología Educativa.* Revista Interuniversitaria de Investigación en Tecnología

Educativa44–59.
Echeverría, R. (1996). *Ontología del lenguaje.* Chile: Dolmen.
Fay, N., Garrod, S., & Carletta, J. (2000). Group discussion as interactive dialogue or as serial monologue: The influence of group size. *Psychological Science, 11*(6), 481–486.
Garello, M. V., Rinaudo, M. C., & Donolo, D. (2011). Valoración de los estudios de diseño como metodología innovadora en una investigación acerca de la construcción del conocimiento en la universidad. *Revista de Educación a Distancia, 5*, 1–34. Retrieved from http://www.um.es/ead/reddusc/5.
Greene, J. A., Hutchinson, L. A., Costa, L. J., & Crompton, H. (2012). Investigating how collage students' task definitions and plans relate to self-regulated learning processing and understanding of a complex science topic. *Contemporary Educational Psychology, 37*, 307–320. https://doi.org/10.1016/j.cedpsych.2012.02.002.
Herrera, M. A. (2004). Las fuentes de aprendizaje en ambientes virtuales educativos. *Revista iberoamericana de Educación OIE, 34*(4), 1–20.
Huber, J., Caine, V., Huber, M., & Steeves, P. (2013). Narrative inquiry as pedagogy in education: The extraordinary potential of living, telling, retelling, and reliving stories of experience. *Review of Research in Education, 37*, 212–242. Retrieved from: www.researchgate.net/profile/Janice_Huber/publication/256545704_Narrative_Inquiry_as_Pedagogy_in_Education_The_Extraordinary_Potential_of_Living_Telling_Retelling_and_Reliving_Stories_of_Experience/links/57f4520908ae8da3ce538869.
Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics, 33*, 159–174. https://doi.org/10.2307/2529310.
Lopez-Perez, M. V., Perez-Lopez, M. C., & Rodriguez-Ariza, L. (2011). Blended learning in higher education: Students' perceptions and their relation to outcomes. *Computers & Education, 56*(3), 818–826. Retrieved March 14, 2018 from https://www.learntechlib.org/p/50834/.
Molina, M., Castro, E., Molina, J. L., & Castro, E. (2011). Un acercamiento a la investigación de diseño a través de los experimentos de enseñanza. *Enseñanza de las ciencias: revista de investigación y experiencias didácticas, 29*(1), 75–88.
Reeves, T. C. (2006). Design research from the technology perspective. In J. van den Akker, K. Gravemeijer, S. McKenney, & N. Nieveen (Eds.). *Educational design research* (pp. 86–109). London: Routledge.
Reeves, T. C., Herrington, J., & Oliver, R. (2002). Authentic activities and online learning. *Paper presented at the 2002 Annual International Conference of the Higher Education Research and Development Society of Australasia (HERDSA)*.
Reeves, T. C. (2000). Enhancing the worth of instructional technology research through "Design experiments" and other development research strategies. *International Perspectives on Instructional Technology Research for the 21st Century Symposium*.
Ricoeur, P. (1984). *La metáfora viva.* Buenos Aires: Editorial Megápolis.
Ricoeur, P. (1988). *Time and narrative, Vol. 3*. University of Chicago P.
Rinaudo, M. C., & Donolo, D. (2010). Estudios de diseño. Una perspectiva prometedora en la investigación educativa. *Revista de educación a distancia, 22*.
Salinas, J. (1997). Nuevos ambientes de aprendizaje para una sociedad de la información. *Revista pensamiento educativo, 20*, 81–104.
Skouge, J. R., & Rao, K. (2009). Digital storytelling in teacher education: Creating transformations through narrative. *Educational Perspectives, 42*(1-2), 54–60. Retrieved from https://eric.ed.gov/?id=EJ858390.
Vigotsky, L. S. (1982). *Obras escogidas, Vol. 2*. Madrid: Visor.
Vargas, M., & L.M (1994). Sobre el concepto de percepción. *Revista Alteridades, 4*(8), 47–53 México: Universidad Autónoma Metropolitana.
Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge university press.