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ARTICLE



## Teachers' academic training for literacy instruction

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### ABSTRACT

Literacy instruction is a powerful determinant of children's academic and school outcomes. Teachers' training for literacy instruction is therefore critical for children's reading learning. The present study examined the contents of 130 courses related to literacy instruction from a representative national sample of primary teachers' undergraduate programs ( $N = 81$ ), to address the following issues: which courses, related to literacy instruction, are included in the curriculum of undergraduate training programs? Which is the weight of the courses in undergraduate programs? What are the contents of the courses? The results show that most critical features of literacy instruction are included in the course contents of most programs (e.g. phonics, theory of literature). Still, some other critical features are underrepresented (reading/writing comprehension skills) or apparently missing (assessment and intervention in reading/writing problems). Moreover, the time allocated to literacy instruction seems to be scarce. Still, wide differences across university programs and courses were found.

### ARTICLE HISTORY

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### KEYWORDS

Literacy instruction; specific content knowledge; reading and writing; undergraduate teachers' training

## Introduction

Literacy instruction is a powerful determinant of children's academic and school outcomes (Aus et al. 2016; Kiuru et al. 2012). It is also generally agreed that high-quality literacy instruction is even more important for at-risk children, such as those from a low socioeconomic status (SES) background, than for other children (Marzano 2003; Moats 2009).

Research has long stressed that the quality of teacher instruction depends in part on teachers' knowledge (Alatalo 2013; Ball, Thames, and Phelps 2008; Phelps and Schilling 2004; Shulman 1986a). In the specific case of literacy instruction,<sup>1</sup> teachers must possess a broad knowledge about areas such as the reading and writing process (e.g. phonemic awareness, decoding, fluency, spelling, orthography, morphosyntax), literature, and literacy assessment, and about how to apply this knowledge in working with students (Lipp et al. 2016; Kosnik et al. 2018). Allington (2002), observing how several of the best elementary school teachers in US approach reading and writing in classroom, concluded that these exemplary teachers: (a) routinely spent about half of the classroom time with reading and writing tasks, against 10/20% in a typical classroom; (b) use texts adapted to

individual students' proficiency; (c) model readers' thinking while readers are trying to decode words or to comprehend texts; (d) encourage lots of talk about classroom tasks, therefore promoting students' problem-solving strategies; (e) engage students in longer assignments (for instance, students could have been working in a writing task for more than 10 days); and (f) use classroom grades that reflect both achievement and effort. Therefore, Allington (2002) states, 'expertise matters' (p. 740).

Our study focus on how teachers' university programs are designed to provide prospective primary teachers the necessary tools to effectively conduct classroom literacy instruction. Moats (2014) stresses that although there is a substantial body of research on the relation between teacher's knowledge, teacher's classroom practices and student's outcomes, more research is needed on how prospective teachers are being taught.

### ***Learning about literacy instruction***

Shulman (1986a, 1986b, 2004) suggested that teachers' professional knowledge includes general pedagogical knowledge (GPK), specific content knowledge (SCK) (also known as disciplinary knowledge), and curricular knowledge (CK), besides knowledge of learners and their developmental characteristics, knowledge of educational contexts and knowledge of areas such as the goals and purposes of instruction.

GPK refers to 'the ways of representing and formulating the subject that make it comprehensible to others' (Schulman, 1986b, p. 9) and includes the understanding of what makes learning easy or difficult. It still includes the knowledge of principles of classroom organization and management, methods of teaching, etc. SCK refers to the amount and organization of subject matter knowledge in the mind of the teacher. Models such as Bloom's cognitive taxonomy and Gagné's varieties of learning have been used to represent content knowledge. SCK also includes the teacher's capability to define to students the acceptable truths in a particular domain, and what is not acceptable and why (the 'syntactic structure of a discipline', according to Schwab 1978). CK includes the range of programs designed to teach particular topics, the instruction materials, and the knowledge of the circumstances under which programs and materials should or should not be used. According to Schulman (1986b) CK is the 'materia medica of pedagogy' (p. 10), the pharmacopeia for students' knowledge limitations.

Since Shulman (1986a) first talked about the concept of teachers' pedagogical content knowledge (PCK) a significant body of research showed the importance of PCK for effective instruction (König and Pflanzl 2016; Kramarski and Michalsky 2010; Krauss et al. 2008; Lee 2010). As a concept, PCK seems to be in the confluence of content knowledge and instructional knowledge. Ball, Thames, and Phelps (2008), for example, maintained that PCK comprises two distinct features: knowledge of content and of the students, and knowledge of instructional strategies. Voss, Kunter, and Baumert (2011) further state that general pedagogical knowledge (an extension of the concept of pedagogical content knowledge) represents a combination of knowledge of classroom management, knowledge of teaching methods, knowledge of classroom assessment, knowledge of learning processes, and knowledge of individual student characteristics. In other words, PCK is about how to instruct students about specific contents (e.g. reading, mathematics) (König and Pflanzl 2016; Oppermann, Anders, and Hachfeld 2016). Still, Loughran,

Berry, and Mulhall (2012) stress that PCK is not a single entity, that it is not the same across individuals and that it develops over time, experience and across contexts.

The broad array of teachers' professional knowledge may be acquired in multiple ways and in several contexts (Al-Barakat and Bataineh 2011; Grosemans et al. 2015; Murphy et al. 2014; Scheerens and Blömeke 2016; Seashore Louis and Lee 2016; Smagorinsky 2018). University teachers' education programs and in-service teachers' training provide structured and intentional training, while schools are socialization contexts where teachers usually get most of their unstructured and unintentional professional knowledge (DeGraff, Schmidt, and Waddell 2015; Grosemans et al. 2015).

In recent years a new line of research has more systematically investigated whether teachers have (or had) the opportunity to learn (OTL) (a) the contents they are supposed to teach and (b) the best strategies to teach these contents. Most research about OTL focuses on formal teacher education, and specifically on undergraduate (University) teacher education (Al Zahrani and Jones 2013; Hölzl 2014; König et al. 2017). Not surprisingly, research has shown that teachers' opportunity to learn widely varies in amount and quality. Nevertheless, OTL studies generically show that 'variations in opportunities to learn in teacher preparation are related to differences in student achievement as assessed by international studies such as PISA and ...TIMSS' (Guerriero 2017, 113). These studies also show that 'teacher knowledge is related to quality teaching, and that pedagogical knowledge can be learned and developed over time given the right opportunities. This has implications for teacher education...' (Guerriero 2017, 113).

### ***Teachers' opportunity to learn the basics of literacy instruction***

The statements about what teachers need to know are recurrent. However, most of these statements are still more normative than empirical. Therefore they may not be especially useful for decision-making about teachers' preparation, about teachers' certification or about teachers' professional growth (Ball, Thames, and Phelps 2008).

Recent developments and findings in reading psychology, as well as the pressure for accountability for students' reading outcomes, have increased the urgency of the debate over elementary teachers' undergraduate preparation, licensing and in-service development (Drechsel et al. 2014; Hendrix-Soto and Mosley Wetzel 2018; Godbey and Dema 2018). University programs for elementary teachers seem to be under pressure to design evidence-based curricula and courses, but that may not be enough to produce real changes in teachers' preparation (Moats 2009; Walsh, Glaser, and Dunne-Wilcox 2006). In the USA, for instance, following disappointment with the limited improvement in many American children's reading in the previous 50 years, the National Council on Teacher Quality (NCTQ) (Walsh, Glaser, and Dunne-Wilcox 2006) decided to investigate how future teachers were being prepared to teach reading. The results of their examination of course contents showed that *'Only 15% of the education schools provide future teachers with minimal exposure to the science [of reading]. Moreover, course syllabi reveal a tendency to dismiss the scientific research in reading, continuing to espouse approaches to reading that will not serve up to 40 percent of all children'* (p. 5). The NCTQ deemed these findings alarming.

Other studies conducted with in-service teachers, some of which with many years of classroom experience, suggest that in-service teacher education is not filling the gap between what teachers actually know and what teachers need to know to teach reading effectively. Moreover, many teachers may be unaware of their knowledge limitations. For

example, Spear-Swerling, Brucker, and Alfano (2005), and Cunningham et al. (2004) found that even experienced teachers might not accurately perceive their knowledge of phonemic awareness, phonics, and early reading development. In a study conducted in Australia, Stark, Snow, Eadie, and Goldfield (2016) found no relationship between teachers' self-ratings of their ability to teach phonemic awareness and their actual knowledge in this area. According to the authors, this finding challenges current pre-service teacher education and in-service professional learning.

Recently, some studies examined teachers' (or prospective teachers) content knowledge about basic reading constructs in countries with languages varying in orthographic depth (e.g. USA, Spain, Portugal). Orthographic depth refers to the extent to which, in an alphabetic language, letter-sound mappings are clear and consistent, or more complex. Washburn et al. (2016), for instance, found that Canadian, English, New Zealand and American pre-service teachers' (PSTs) knowledge about phonological and phonemic awareness, the alphabetic principle and phonics instruction, and morphology and morpheme awareness, was limited. Spear-Swerling et al. (2016) also compared American and Portuguese teachers regarding their planning of a literacy instruction unit. The results showed that American teachers spend considerable time with phonics instruction while the Portuguese teachers spend more time with writing processes such as revision. Differences in orthographic depth between the English (more depth) and the Portuguese can partially explain these findings. Spear-Swerling et al. (2016) also found that many teachers omit important components of literacy instruction (such as vocabulary and spelling) in their practices, and that teachers show substantial variability in their literacy instruction planning.

Overall, it seems that despite the claims about the relation between teachers' knowledge, teachers' quality of instruction, and students' outcomes, we still need to deepen our knowledge about teachers' preparation programs in the area of literacy instruction.

### ***What makes a teachers' training program in the area of literacy instruction effective***

Defining and measuring the effectiveness of a teachers' training university program in the area of literacy instruction is not straightforward. In theory, any program, to be effective, must be able to provide content and pedagogical knowledge and to provide students the tools to connect university knowledge to (future) classroom practices. Moreover, there must be evidence that classroom practices, based in the university program, impact students' achievement.

The International Reading Association (IRA), one of the most active and influential literacy organization, conducted several of the most important studies and research surveys about teachers' training for reading instruction in the last 30 years (Dillon et al. 2010). In the first phase of these studies, Harmon et al. (2000) identified eight features common to excellent reading teacher programs (e.g. 'programs are based on clearly articulated institutional missions', 'programs deliver broad-based content', 'carefully supervised apprenticeship'). In a second phase, Maloch et al. (2003) conducted a longitudinal study with graduates from some of these programs. The authors found that, contrary to what was suggested by other studies, excellent preparation programs positively influence novice teachers' perceptions about what meant to teach reading. In a third round of

studies, Hoffman et al. (2005) compared three groups of teachers of the same school: one group of teachers that graduated in excellent programs, one group of same-years experienced teachers and one group of highly experienced teachers. The results showed that the teachers that graduated in excellent programs were more effective than teachers from the other groups in creating a high-quality literacy environment.

More recently, Lenski et al. (2013) studied how nine university programs organized literacy instruction for prospective teachers. The main goal of the researchers was to identify programs' communalities and what the authors called 'signature aspects' of each program. Lenski et al. (2013) found that most programs prioritize literacy theory, instructional practices, and the knowledge of assessment procedures. This prioritization is in line with the Standards for Reading Professionals developed by the International Reading Association (International Reading Association 2010): (1) foundational knowledge, (2) curriculum and instruction, (3) assessment and evaluation, (4) diversity, and (5) literate environment. The authors also found that all programs systematically showed candidates how to apply the knowledge learned in individual courses (that is, specific courses during a teacher licensure program). However, each program had unique features that seemed to depend on the context of each university.

In sum, research has already identified core components of effective classroom literacy instruction as well as effective university programs for prospective teachers in the area of literacy instruction. However, our knowledge about how and in what extent is this knowledge actually being taught in university teachers' education programs is limited and needs to be significantly extended (de Silva Joyce et al. 2014).

## Research questions

The major goal of this research was to examine undergraduate training programs for primary teachers in the area of literacy instruction. Specifically, the following research questions were considered: which courses, related to literacy instruction, are included in the curricula of undergraduate training programs of Portuguese primary teachers? Which is the weight of the courses related to literacy instruction in undergraduate programs? What are the specific contents of the courses associated with literacy instruction?

Two different but closely related studies were designed to address the goals of the research.

## Study 1: courses related to literacy instruction (reading and writing) in undergraduate teachers' training programs

### Method

#### Sample

In Portugal, primary teachers can get their academic qualifications either at a Polytechnic School (the most frequent) or at a University. A search on the site of the DGES (National Directorate for Higher Education) (where any university program must be registered) allowed us to find eighty-one undergraduate programs for primary teachers, conducted in 30 Universities and Polytechnic Schools in the whole country.

These eighty-one programs (the universe of undergraduate programs for primary teachers in Portugal) constitute the *corpus* of this study.

Portuguese primary teachers obtain their qualifications through a five-year program. This program includes a three-year period of academic training (named *licensure*) and a two-year practice-oriented training (conferring a Master's degree). The final year of the practice-oriented training constitutes a student teaching internship. No further requirements are involved in becoming a professional teacher. Table 1 shows how the 81 teachers' undergraduate programs were distributed across the different degrees.

### Procedure

After determining the universe of the teachers' undergraduate programs, the curricula were formally analyzed (from information available online) to identify the courses that could be associated with the teaching of reading and writing. A course syllabus was collected for each of these courses. We focused on courses in which content knowledge about how to teach literacy was the main purview of the course (reading/writing related courses).

To complete the curricula examination we performed a qualitative content analysis of the titles of the courses included in the university programs. The content analysis procedure allows an inductive approach aimed to identify the patterns of meaningful dimensions that emerge from the data collected (Patton 2015). Instead of adopting a predetermined theoretical categorization to analyse data, we adopted a data driven approach, discarding a priori assumptions. This methodological option is the one that best suites the objectives of characterization and analysis of initial teacher training, in order to contribute to the conceptualization of forthcoming teachers training.

From the content analysis of the courses' titles related to the teaching of reading and writing, six disciplinary groups emerged from the content analysis of the titles of the courses (following the denomination of the disciplinary groups, examples of the titles of specific courses are provided): 'Didactics of reading/Didactics of Portuguese Language' (e.g. Didactics of Maternal Language, Didactics of Portuguese, Didactics of Portuguese Language), 'Reading and Writing' (e.g. Text Production and Analysis, Learning of Reading and Writing, Reading and Writing), 'Portuguese Language' (e.g. Phonetics and Phonology of the Portuguese Language, Portuguese I, Structure of Portuguese Language), 'Linguistics' (e.g. Linguistics of Portuguese I, Introduction to Linguistics Studies, Language and Linguistics), 'Language' (e.g. Language Acquisition, Language Acquisition and Development, Language Studies) and 'Literature' (e.g. Theory of Literature, Literature of Portuguese Language, Literature for Infancy). This procedure allowed for a quantitative representation of the different courses related to literacy instruction in the framework of each program. We then analyzed how the six disciplinary groups were represented in the

**Table 1.** University/Polytechnic teacher undergraduate programs (n = 81) related to literacy instruction.

Degree Program	Masters				
	Licensure	Integrated Masters	Professional Masters		Teachers Grades 1–6
		Primary teachers	Pre- Primary and Primary teachers	Primary teachers	
N	30	2	23	7	19

**Table 2.** Mean percent credits (ECTS) by disciplinary group and type of degree program (n = 81).

<i>Degree Program</i>	Mean percent (%) of ECTS by disciplinary groups and by degree program					
	Didactics of reading/ Portuguese Language	Reading and Writing	Portuguese Language	Linguistics	Language	Literature
Licensure (n = 30)	2.3	1.3	5.7	1.7	1.8	4.4
Integrated Masters (n = 2)	2.3	1.3	6.1	0	0	3.8
Masters (pre-primary and primary teachers) (n = 23)	7.6	0	0.2	0	0	0.8
Masters (primary teachers only) (n = 7)	10.3	0	0	0	0	0
Masters (primary and junior secondary education) (n = 19)	6.3	0.5	4.6	1.1	0.6	1.1

various types of degree qualifications (e.g. licensure vs. Masters) for preparing Portuguese primary teachers, as described below.

## Results

### *The teaching of reading and writing in teachers' university training programs*

In Portugal, licensure programs for primary teachers run for three years. However, to qualify for the profession, students must take an additional two-year Master's program (the last of which is a supervised internship, as previously stated). Table 2 shows the loading of reading/writing related courses in the 81 teachers' university training programs reviewed. The results are presented in the form of mean percent ECTS (European Credit Transfer System) allocated to the disciplinary groups in the different types of academic degrees.<sup>2</sup> The use of the average percent ECTS allows a direct comparison between programs and gives a clear picture of the time allocated to each disciplinary group.

The results show that the disciplinary group Didactics of Reading/Portuguese Language receives a relatively high emphasis in Master's degree programs but less emphasis in licensure programs. This difference is most likely explained by the fact that licensure programs for primary teachers (the first three years of university preparation) are more academic in nature. The goal of licensure programs is to provide training teachers with a broad spectrum of knowledge that come from different disciplines (e.g. education, psychology, literature, mathematics). Master's programs, in turn, are practice oriented. Therefore, individual courses tend to be limited to didactics that typically works as a theoretical support to the student internship.

## Study 2: content analysis of the courses associated with literacy instruction

### *Method*

#### *Sample*

After identifying the disciplinary groups related to literacy instruction in teacher preparation courses in Portugal, as well as the mean ECTS by disciplinary group and type of degree program, we further examined the specific contents of these courses. In total, we examined the contents of 130 courses across the 81 programs. Table 3 displays the number of courses per disciplinary group.



**Table 3.** Courses associated with reading and writing.

Group	Didactics of reading/ Portuguese Language	Reading and Writing	Portuguese Language	Linguistics	Language	Literature	Total
Courses (n)	37	9	32	16	11	25	130

### Procedure

Altogether, 239 course contents were requested from the 81 programs described in Study 1. The return rate was 58.2%, corresponding to 139 courses. Nine out of the 139 courses were excluded from further analysis because their contents were irrelevant for our disciplinary groups of interest. The final sample for the content analysis is therefore 130 courses.

The content analysis of the 130 courses resulted in several content categories independently established by two senior university researchers. An exploratory content analysis of a sub-sample of courses was first used to identify emerging themes that could justify the establishment of a corresponding content category (cf. Patton 2015). After the establishment of the content categories, (see Table 4) the occurrence of these categories in each of the 130 courses was examined and computed. Since the categories were quite clear, inter-observer agreement was high (up to 95%). In the few cases where disagreement occurred, raters discussed the categorization until inter-rater's agreement was achieved. Thus, there was no need for a third rater or further analysis.

## Results

### Content analysis categories

Table 4 shows the content categories identified for each disciplinary group. The content categories are mutually exclusive, and their designation aims to reflect the type of course content they represent. However, the same content category may re-occur in different disciplinary groups, due to the coincidence of course contents in different courses.

**Table 4.** Content categories by disciplinary group.

Disciplinary group	Content Categories
Didactics	1. Didactics of reading; 2. Didactics of writing; 3. Didactics of evaluation; 4. Didactics of orality; 5. Didactics of grammar; 6. Didactics of Portuguese Language; 7. Didactics of literature; 8. Theory of didactics; 9. Portuguese Language knowledge; 10. Reading knowledge; 11. Writing knowledge; 12. Language knowledge; 13. Curricular organization; 14. Non-codable.
Reading and Writing	1. Text production; 2. Reading and writing; 3. Non-codable.
Portuguese Language	1. Spelling; 2. Morphology; 3. Syntax; 4. Semantics; 5. Pragmatics; 6. Phonetics and phonology; 7. Theory of text; 8. Genesis and evolution of the Portuguese Language; 9. Portuguese Language Knowledge; 10. Language; 11. Non-codable.
Linguistics	1. Phonetics and phonology; 2. Morphology; 3. Syntax; 4. Lexicon and Semantics; 5. Pragmatics; 6. Spelling; 7. Prosody; 8. Genesis and evolution of the Portuguese Language; 9. Grammar; 10. Theory of Linguistics; 11. Non-codable
Language	1. Acquisition and development of the Language; 2. Phonetics and phonology, 3. Morphology; 4. Syntax; 5. Lexicon and Semantics; 6. Pragmatics; 7. Emergent Literacy; 8. Orality; 9. Theory of Language; 10. Non-codable
Literature	1. Theory of Literature; 2. Works and authors; 3. Training of readers; 4. Non-codable

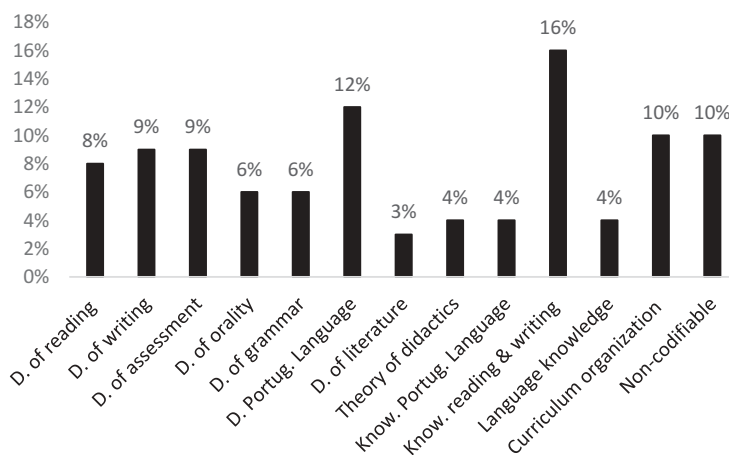
### Quantitative results of the content analysis

The quantitative analyses are based on indices of the frequency of content analysis categories. The indices resulted from the following criteria: 1) delimitation of units of analysis; 2) adoption of a criterion to compute the absolute frequency (based on the presence vs. absence of each category per unit of analysis) and 3) computation of the number of units of analysis by course and by disciplinary group. The units of analysis were established by correspondence with the organization and distribution of the contents by different topics or thematic modules that served as a reference to the delimitation of the units of analysis (criterion 1). Also, each category was accounted for only once per unit of analysis (criterion 2), regardless of the number of times it appeared in the same topic. This criterion was used to determine the number of times a content category occurs in a particular set (total frequency) and allowed uniformity in the quantification of categories since the courses vary in degree of detail and do not provide information on the relative weight of each type of course content. Finally, the total number of units of analysis was determined (criterion 3). Table 5 summarizes the data derived from these criteria.

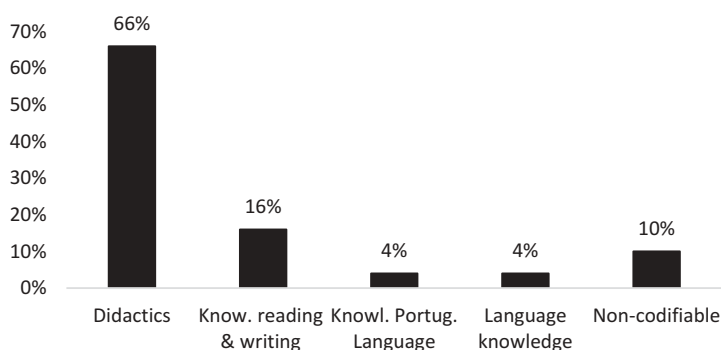
Figure 1 shows the relative frequency (the number of times that a specific category occurs divided by the total number of categories within the disciplinary group) of each content category within the disciplinary group of Didactics. The category 'didactics of the Portuguese language,' for instance, has an absolute frequency of 37 (the number of times the category occurs in the courses included in the disciplinary group) (see Table 3). Since the total number of content categories in the disciplinary group of didactics is 304 (see Table 5), the relative frequency of the category 'didactics of the Portuguese language' is  $37/304 = 12\%$ .

**Table 5.** Number of units of analysis and frequency of content categories by disciplinary group.

<i>Disciplinary Group</i>	Didactics of reading/ Portuguese Language	Reading and Writing	Portuguese Language	Linguistics	Language	Literature
Units of analysis	194	45	139	79	64	161
Content categories	304	62	159	112	82	176



**Figure 1.** Relative frequency of the content categories of the disciplinary group of Didactics.



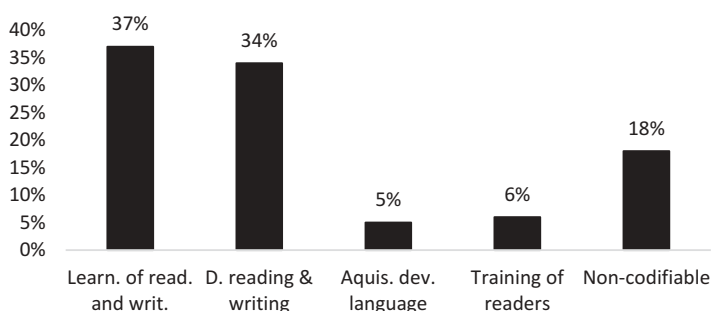
**Figure 2.** Relative frequency of categories of the disciplinary group of didactics.

Considering the number of content categories that emerged in this analysis, second order categories, by scientific domain, were further created (see Figure 2). Second-order categories result from a combination of first-order categories that are from the same scientific domain. This strategy allows a synthetic representation of content categories within disciplinary groups.

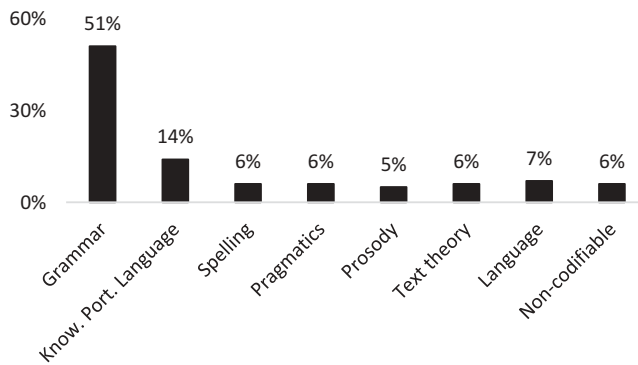
The same strategy of analysis was followed for the relative frequency of content categories within the disciplinary groups of Reading and Writing, Portuguese Language, Linguistics, and Language. For space reasons, only the results of the second order analysis are presented (Figures 3–6). Since the number of categories for the disciplinary group of Literature is small, no second order grouping of categories was conducted (Figure 7).

## Discussion

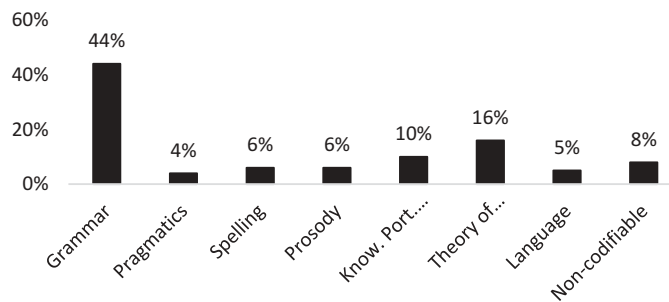
The major goal of this study was to examine how undergraduate university programs prepare primary teachers' in the area of literacy instruction. Specifically, the following research questions were considered: which courses, related to literacy instruction, are included in the curriculum of undergraduate training programs of Portuguese primary teachers? Which is the weight of the courses related to literacy instruction in undergraduate programs? What are the specific contents of the courses associated with literacy instruction?



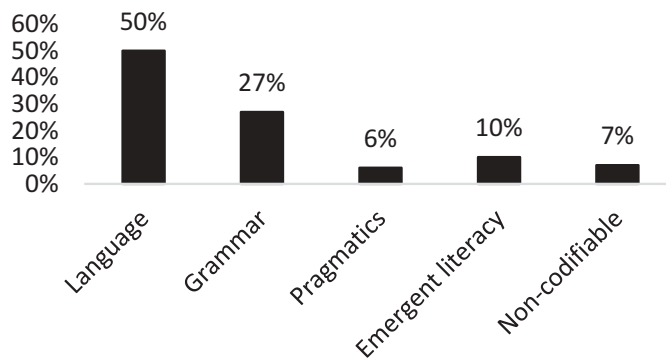
**Figure 3.** Relative frequency of second-order categories of the disciplinary group of reading and writing.



**Figure 4.** Relative frequency of second-order categories of the disciplinary group of Portuguese language.



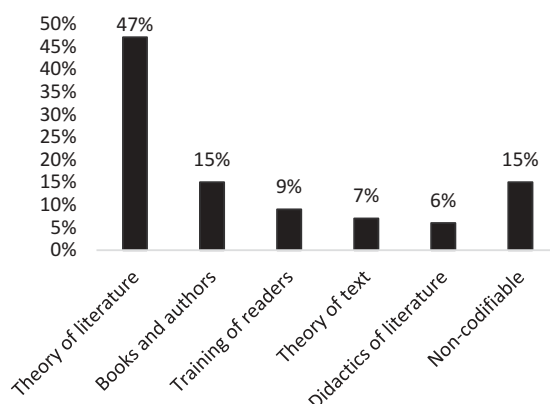
**Figure 5.** Relative frequency of second-order categories of the disciplinary group of linguistics.



**Figure 6.** Relative frequency of second-order categories of the disciplinary group of language.

### ***Courses and courses weight in undergraduate programs***

With regard to the first two questions of our study, the results showed that in Portugal, as well as in other countries, university undergraduate programs cover a wide variety of contents in the domain of literacy instruction, and in different extents. For example, one program might cover language development at great length and another program might cover only a few contents of language development. Therefore, teachers in



**Figure 7.** Relative frequency of the categories of the disciplinary group of literature.

some programs may not receive adequate training in some important areas. Alatalo (2013) for instance found that many Sweden participants have difficulties to provide adequate instruction in the basics of reading and writing or language development. The variety of programs may be partly explained by the fact that there is not a universal agreement on the core knowledge of reading and writing instruction. As Perkins (2013) put it ‘...the knowledge required to teach reading is not easily defined and is problematic.’

Ideology may also influence the choice of contents of teacher preparation programs regarding reading and writing instruction (Chall 2000; Rasinski 2016; Walsh, Glaser, and Dunne-Wilcox 2006). Not by chance, these ideological influences were known as ‘reading wars’ (Chall 1967), and had a significant impact on teachers’ reading and writing training (Lopes et al. 2014). In the specific case of Portugal, universities have a considerable autonomy in designing their undergraduate programs and in deciding on course contents, thus likely increasing undergraduate programs diversity.

The content analysis of the 130 courses of our study showed that most of the courses’ contents address the core features of literacy instruction: the broad group of Didactics covers the domain of pedagogical content knowledge (Shulman 1986a, 2004), and the other disciplinary groups (Reading and Writing, Portuguese Language, Linguistics, Language and Literature) cover the required specific content knowledge for effective reading instruction (Cameron, Van Meter, and Long 2017; Rasinski 2016; Stark et al. 2016). With regard to instruction, the disciplinary group of Didactics of most programs seems to extensively focus on pedagogical content knowledge, a basic feature of the instruction of reading and writing (Shulman 1986a, 2004; König et al. 2017). The didactics of reading, writing, orality, grammar, or literature, are some of the contents commonly found in the teachers’ preparation programs that we examined. Other categories like reading knowledge or writing knowledge were also found. Still, it is important to note that the disciplinary group of didactics holds the strongest number of credits in most teachers undergraduate programs, which suggests that most programs highly value the ‘how to’ of the teaching profession.

Although it seems that the course contents we reviewed include much of what is considered relevant for teachers’ training in literacy instruction we may question whether

the time allocated to these topics (between 11% to 17% of the total time of the undergraduate programs) is sufficient to adequately prepare prospective teachers for literacy instruction. Although there is no rule of thumb, some authors (e.g. Allington 2002) state that excellent teachers spent about half of the classroom time with reading and writing, which suggests that prospective teachers should receive much more than 11% to 17% of their undergraduate instructional time on these topics. Also, a study of Lopes et al. (2014) found that the perceived disciplinary knowledge of Portuguese teachers about phonics, about reading fluency/vocabulary/comprehension and about assessment/intervention (mainly this) is significantly higher than their actual knowledge in these areas. This finding also suggests that although most of the essentials topics of literacy instruction are approached in undergraduate teachers' programs, something is missing.

### ***Courses' contents for literacy instruction in undergraduate programs***

With regard to the third research question of our study (specific content knowledge related to literacy instruction), the results confirm that teachers' undergraduate programs address critical components of literacy instruction. Phonetics and phonology, emergent literacy, reading and writing, spelling, morphology, syntax, and grammar, are among these widely recognized critical components of reading and writing learning (Brothers and Traxler 2016; Carreker, Joshi, and Boulware-Gooden 2010; Pinto et al. 2016; Suggate 2016; Zhang 2012). It is interesting to stress that the inclusion of phonology (not phonetics) in Portuguese teachers' training programs is recent, apparently because the Portuguese orthography is relatively shallow (Serrano et al. 2011; Seymour, Aro, and Erskine 2003) and most Portuguese children readily learn how to decode. Also, theory of literature, learning about children's authors, and methods of reading instruction, seem to be valued in most undergraduate programs.

There are however two important components of literacy instruction that are underrepresented (or even missing) in the contents of undergraduate programs reviewed in our study: reading/writing comprehension, and assessment and intervention in reading/writing problems.

As some authors suggest (e.g. McGuinness 2005), most children can easily learn how to decode in shallow orthographies but that does not necessarily mean that they will be good text comprehenders. To be good text comprehenders, students must read a lot, must be fluent readers, must have good morphological knowledge, must have good syntactic knowledge, must show reading prosody and must develop deep lexical knowledge (Daugaard, Cain, and Elbro 2017; Hebert et al. 2016; Rasinski et al. 2017; Tong and McBride 2017). The underrepresentation of reading comprehension in undergraduate programs may somehow justify why the PISA results (OECD 2009, 2012) show that Portuguese students perform much better in literal comprehension items than in inferential comprehension items. This underrepresentation may also compromise prospective teachers' ability to provide their students high-order reading and writing strategies (e.g. reading and writing self-regulatory strategies).

Eventually, the most important finding of our study is the virtual absence of contents related to assessment and intervention strategies for children with reading and writing disabilities. This finding is quite worrisome because this knowledge is critical for good literacy instruction and for the early detection and resolution of children's difficulties with

reading and writing (Fletcher et al. 2013; Fletcher and Vaughn 2009; Vaughn, Denton, and Fletcher 2010; Vellutino et al. 2006). If pre-service teachers have no opportunity to learn about how to effectively assess and intervene in reading and writing problems, they will not be able to effectively deal with these problems (König et al. 2017).

The lack of undergraduate training in the assessment and intervention in reading and writing difficulties may explain why teachers tend to delay interventions with struggling readers or why school retention and school social promotion are more usual than early interventions in reading/writing difficulties (Lopes 2005). School retention and school promotion may be perceived as effective intervention strategies when they are, indeed, a mere acknowledgment of the situation (Diris 2017). Jimerson et al. (2006) stress that research show that neither social promotion nor grade retention can achieve educational success and that educational professionals must be aware of evidence-based strategies that effectively address students' learning deficits. In addition, Picklo and Christenson (2005) emphasize that... 'Many researchers agree that the best solution to the retention versus social promotion debate is to prevent academic failure before it occurs' (p. 260).

Spear-Swerling, Brucker, and Alfano (2005) found that even some experienced and qualified teachers in their sample were not familiar with risk factors for reading problems and were unaware of critical assessment tools. Spear-Swerling and Cheesman (2012) verified that 53% and 63% of the participant teachers in their study were unable to check whether a book was too difficult for a child whose reading precision was far below a 90% level. Moats and Foorman (2003) also found that 44% of the participants could not easily detect that a child was using the context to compensate for her decoding problems. Still, Lopes et al. (2014) conducted a study comparing American and Portuguese teachers' knowledge and teachers' perceived knowledge about several features of reading instruction. Notably, the Portuguese teachers only perceived themselves as more knowledgeable than American teachers in the area of assessment and intervention. Paradoxically, this is by far the area of disciplinary knowledge where Portuguese teachers perform worst in the knowledge text (the Portuguese teachers got a mean of 15.4% correct answers against 46.2% of the American teachers). These results, together with the results of the present study, raise serious concerns about Portuguese teachers' preparedness to deal with struggling readers/writers.

In sum, the contents of the teacher undergraduate programs reviewed in our study seem to approach most of the relevant topics in the areas of literacy instruction. However, three major concerns need to be addressed: (1) the time allocated to literacy instruction seems limited; (2) reading and writing comprehension is underrepresented in most undergraduate programs; (3) last and most important, assessment and intervention in reading/writing problems are virtually absent of most programs.

### ***Implications for teacher education***

Our study have a number of implications for the preparation of Portuguese primary teachers for literacy instruction. The results suggest that undergraduate university programs in Portugal (a) should allocate more time to literacy instruction (in general); (b) should spent more instructional time with reading/writing comprehension and with high-order reading and writing skills; and, above all, (c) should expressly encompass

contents that provide prospective teachers with assessment and intervention skills and strategies for children with learning problems. Moreover (d) it is important to reduce the variability of the university programs, because, according to the university or to the specific program, a prospective teacher may get, for instance, either an extensive preparation or a quite deficient preparation in language development.

The variability of programs for literacy instruction does not seem to be a Portuguese idiosyncrasy. Actually, it seems to reflect worldwide difficulties in the definition of the knowledge required to teach reading (Pryor et al. 2012; Perkins 2013). The guidelines of associations like IRA (2010) do not seem to have enough impact in many university programs or may be implemented in rather different ways. In the case of Portugal, the IRA recommendations about students' training in the assessment and intervention of children with learning problems, for instance, deserve much better consideration.

Certainly, some diversity in the university programs is welcome. However, so much variability suggests that the field could not yet define a core knowledge of literacy instruction, unlike areas such as medicine or architecture. Therefore, despite difficulties, efforts to better define a core knowledge of literacy instruction remain on the agenda.

Finally, we must stress that in Portugal, as well as in other countries, primary teachers have long professional careers. Consequently, university training for literacy instruction can only provide the basics of teachers' knowledge in this domain. In-service teacher education is crucial to keep teachers up-to-date with scientific and pedagogical findings in the area of literacy and literacy instruction. We believe that primary teachers, in order to be good professionals throughout life, must have the opportunity to get high-quality training in literacy instruction in a regular basis, and through an organized and supervised system.

## Limitations

Although we have examined the universe of primary teacher education programs in Portugal, we have no information about how program contents are conveyed to the prospective teachers. While it is important to know the kind of contents that are being taught in teacher preparation programs, the way they are taught is no less important. Therefore, while we can be conclusive about the contents that are included in the courses, we do not know whether or how these contents are in fact taught in universities. Also, in some courses, it was difficult to separate contents related to methods of reading instruction from contents related to children's reading development, because the authors did not provide clear cues about the contents that were specifically related to teaching methods.

Despite these limitations, we believe that the present study adds significantly to the knowledge about undergraduate teacher's training in Portugal.

## Notes

1. Throughout this article, the term literacy instruction will be used to refer to the instruction of reading and writing.
2. The ECTS show the weight of any course or group of courses in the framework of a reliable, standardized, and international system.



## Disclosure statement

No potential conflict of interest was reported by the authors.

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