VERBAL, NOMINAL AND ADJECTIVAL INFLECTION IN THE ELECTRONIC DICTIONARY OF SIMPLE FORMS OF SPANISH

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1. The System of Electronic Dictionaries of Spanish (SEDS, from now on) is an application to the Spanish language of the DELA System, a language independent system of electronic dictionaries, that has been developed in the Laboratoire d’Automatique Documentaire et Linguistique of the University of Paris 7. The SEDS (System of Electronic Dictionaries of Spanish) has a modular structure, and is composed of electronic dictionaries of canonical forms and electronic dictionaries of inflected forms, which are automatically generated by programs.

The Electronic Dictionary of Simple Forms of Spanish (EDSFS) is a module of the SEDS, and is composed of 68,000 entries, which belong to the general lexicon of simple forms, that is, chains of characters between two consecutive blank spaces, which work as a unit in the Spanish lexicon. Each EDSFS entry is accompanied by an alphanumeric code, which specifies its inflectional morphological properties and/or its grammatical category. The EDSFS entries are in their canonical form, that is, verbs are in their infinitive form, and nouns and adjectives in their masculine and/or singular form. The inflected forms of the verbs, nouns and adjectives of the EDSFS are automatically obtained through programs, which generate the Electronic Dictionary of Simple Inflected Forms of Spanish (EDSIFS, from now on) from the EDSFS. The EDSIFS, which contains about 556,000 forms with inflectional and/or categorial information, includes all possible forms belonging to the general lexicon of the Spanish language. The inflection programs use the morphological code(s), attached to the EDSFS entries to automatically generate its inflected forms. The codification of the
inflectional properties of the verbal, nominal and adjectival entries of the EDSFS requires a systematic study and classification of the inflectional morphology of verbs, nouns and adjectives in the Spanish lexicon.

2.1. Studies of verbal inflection in Spanish traditional grammar do not initially establish a distinction between actual morphological irregularities and mere spelling changes; thus, a distinction is not made between phonetic changes which correspond to morphological irregularities in relation with regular conjugation models and spelling changes which do not correspond to actual phonetic changes as regards regular conjugation patterns. As a result, traditional grammar confuses actual morphological irregularities with mere spelling changes, and consequently deals with them jointly. For instance, Villar (1651:47) does not distinguish the morphological inflectional properties of the verbal, nominal and adjectival entries of the EDSFS requires a systematic study and classification of the inflectional morphemes of verbs, nouns and adjectives in the Spanish lexicon.

Martínez Gómez Gayoso (1769:211 ff) deals with morphological irregularities of verbal inflection, as for instance the alternations in the verbal root between /e/ and /ie/, /o/ and /ue/, or /i/ and /e/, without distinguishing them from mere spelling changes, like for instance the alternations between “c” and “qu”, “g” and “gu”, or “g” and “j”, which correspond to alternative spellings of /k/, /g/ and /s/ respectively, and as a result, do not constitute actual morphological irregularities.

San Pedro (1769, vol.II, p.30) also gives a definition of an irregular verb, which is mainly based on spelling:

“De los Verbos anómalos o irregulares.
Se llaman verbos anómalos o irregulares los que en la formación de sus tiempos i personas no guardan la analogía i reglas de las Conjugaciones regulares según se an dado en los ejemplos precedentes; porque mudan alguna letra o sílaba.”

Despite giving a spelling based definition, San Pedro’s (1769) classification of verbal irregularities does not include verbs which only present spelling changes in their conjugation (cf. op.cit., pp.31-53). However, San Pedro presents for instance the spelling changes of the verb leer (to read) as an irregularity, since he does not consider as a regular process the systematic alternation between the unstressed vowel /i/ in intervocalic position and the consonant /j/ in the conjugation of leer (cf. San Pedro op.cit., vol.I, pp.41-2 and below).

On the contrary, the first edition of the Royal Spanish Academy’s Gramática (1771), establishes a distinction between morphological irregularities, which introduce phonetic changes in the verbal ending and/or root, and mere spelling changes, corresponding to usually regular alternative spellings of the same sound.

“VERBOS IRREGULARES son los que se apartan de las reglas que siguen los regulares (...).

Pero la identidad de letras radicales, y terminaciones, que allí se establece para distinguir los verbos regulares de los irregulares, debe entenderse (…) que no comprende las leyes mutaciones á que obliga la ortografía; y así los verbos acabados en car, en cer, en cér, en gáro no dejarán de ser regulares solo porque algunas personas de los tres primeros muden la c en qu, ó en z, y los del último admitan a después de la g, pues esto consiste en el distinto valor que tienen la c, y la g, con las letras a, o, u, que con la e, y la i: v.g. en los verbos tocar, vencer, resarcar, pagar, decimos toqué, venzo, resarzo, pagué; porque (…) no se puede decir: tocé, vencía, resarca, pagó; y así se buscan letras equivalentes para igualar la pronunciación fuerte, ó suave que se requiere.
But the Royal Spanish Academy (1771 and 1796) not only considers to be regular those verbs which present mere spelling changes, but also those verbs which present systematic changes in the formation of its tenses. As a matter of fact, the Academy (1771:113-4 and 1796:145-6) considers a verb to be regular when it shows an alternation between /i/ and /y/ in the formation of a verbal tense, if /i/ is an unstressed vowel in intervocalic position, since this alternation is part of a general morphophonological process in Spanish. Thus, for instance, the Academy considers the verb *creer* (to believe) to be regular, although the unstressed vowel /i/ of the verbal ending /ið/ of the third person singular of the past indefinite indicative becomes /y/. Actually, the Academy considers *creer* to be regular, because the unstressed vowel /i/ in intervocalic position becomes systematically /y/, when /kre/, the verbal root of *creer*, is combined with the verbal ending /ið/ of the past indefinite indicative. Consequently, the Academy, in contrast with the above mentioned grammarians, does not consider as irregular those verbs which show phonetic changes which correspond to regular morphophonological processes (cf. Real Academia Española 1796:145-6):

“Tampoco lo son [irregulares] los verbos acabados en *eer*, como: *creer*, *leer*, *poseer*, *prover*, porque en las terminaciones que tienen *i*, la mudan en *y* cuando yere á la vocal siguiente: *creí*, *creyo*, *creyeron*, *lei*, *leyera*, *leyese*, *poseí*, *poseyere*, *poseyérenos*.

La misma mutación de vocal en consonante requieren los verbos acabados en *uir*, cuando la *u* y la *i* forman dos sílabas; como:

- *argüir*..........*arguyo*, &c.
- *attribuir*..........*atribuyo*.
- *constituir*..........*constituyo*.
- *contribuir*..........*contribuyo*.
- *destruir*..........*destruyo*.
- *distribuir*..........*distribuyo*.
- *excluir*..........*excluyo*.
- *fluir*..........*fluyo*.
- *huir*..........*huyo*.
- *imbuir*..........*imbuyo*.

After 1771, the Academy's proposal to consider only actual phonetic changes, as regards regular conjugation models, as criteria to study verbal inflection was adopted by the Spanish grammatical tradition, as can be observed both in traditional grammars and specific studies of verbal inflection, like conjugation dictionaries. For instance, Bello (1860:172) studies the irregularities of verbal inflection by using the same criteria as the Academy (1771): he considers to be irregular only those verbs which present phonetic changes as regards regular conjugation models:

“**VERBOS IRREGULARES**

497. Para calificar a un verbo de regular o irregular no debe atenderse a las letras con que se escribe sino a los sonidos con que se pronuncia. Como conjugamos con el oído, no con la vista, no hay ninguna irregularidad en las variaciones de letras que son necesarias para que no se alteren los sonidos.

Por ejemplo, el verbo *aplacar* no deja de ser regular porque muda la *c* radical en *qu*, en todas las formas cuya terminación es *e* o principio por *e*, como en *aplaqué*, *aplaque*, *aplaques*, *aplaquemos*; pues para conservar el sonido fuerte de la *c* antes de las vocales *e*, *i*, es necesario, escribiendo, convertirla en *qu*. Por una razón semejante no es irregular el verbo *meecer*, cuando muda la *c* de la raíz en *z* para conservar el sonido suave de la *c* (yo *mezco*, él *meza*); ni el verbo *delinquir* mutando la *qu* en *c* (delinquo, *delinca*), por no permitir el uso actual que se escriba jamás *qu* sino antes de las vocales *e*, *i*, ni el verbo *pagar* tomando una *u* muda cuando la terminación es *e* o principio por *e* (pague, *pague*, *pagues*, *paguemos*), por cuanto la ortografía corriente pide esta *u* muda antes de las vocales *e*, *i*, para conservar el sonido de la *g*; ni el verbo *seguir* perdiendo la *u* muda cuando la terminación es en *a*, *o*, o principio por *a* (siga, *siga*, *sigamos*), por cuanto no es permitido poner jamás la *u* muda sino antes de las vocales *e*, *i*."

Bello (1860:173), as does the Academy (1771), does not consider as verbal irregularities those phonetic changes which are a result of regular morphophonological processes, such as the change of un­stressed *i*/ to /y/, when /i/ is in intervocalic position; moreover, Bello points out that the aforementioned morphophonological process occurs both in verbal as well as in nominal inflection:
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Furthermore, Elizaga’s dictionary of the Spanish conjugation of 1881 considers only as irregular those verbs which present phonetic changes as regards regular conjugation models and also considers as regular those verbs which present systematic morphophonological changes in their conjugation (cf. op.cit., p.10):

“(…) las leves mutaciones á que obliga á veces la ortografía no implican irregularidad. Así por ejemplo los verbos acabados en car, cer y cor, no dejan de ser regulares porque en algunas de sus personas muden la c en qu ó en z; ni los acabados en cur, ger y gir, porque en algunas de las suyas admitan u despues de la g, ó la cambien en j; tampoco lo es el verbo delinquir aunque algunas personas de sus tiempos no tengan qu, como delinco, delincamos; ni lo son ciertos verbos acabados en aer, eer, oer, que en las terminaciones que tienen i la mudan en y cuando hiere á la vocal siguiente.”

There are many other studies of Spanish verbal inflection in which the starting assumption is an explicit separation of purely morphological irregularities and mere spelling changes, as for instance, Pelegrín (1826:118-9), Jiménez Aquino (1888:115), or Alonso Cortés (1918:77). The distinction between morphological irregularities and spelling changes seems to be so deeply rooted in the Spanish grammatical tradition of this period, that it can even be observed in pedagogical grammars. Thus, for instance, the establishment of the distinction between morphological irregularities and spelling changes in the study of verbal inflection can be observed in the pedagogical grammar of an anonymous author (cf. Anonymous 1844:67-8), written in dialogue form:

“DE LOS VERBOS IRREGULARES
P. Cuáles son los verbos, que se llaman irregulares?
R. Aquellos que mudan alguna de las letras radicales en varios tiempos y personas. (…) 
P. Serán verbos irregulares todos los que mudan algunas letras radicales?

Moreover, España (1918:33), in a pedagogically oriented booklet entitled “Procedimiento sencillo para aprender a conjugar los verbos irregulares castellanos” (An Easy Procedure to Learn the Conjugation of Spanish Irregular Verbs), points out that “no todo cambio de letras supone irregularidad” and adds: “Un verbo no se considera irregular por el cambio de letras si este cambio se verifica para la conservación del sonido”. This odd manual gives a visual analysis of the Spanish verbal inflection by including transparent pages with boxes, drawn with continuous lines, discontinuous lines, dotted lines, etc., which coincide with the corresponding irregular verbal tense(s) of the following page.

The fact that only phonetic changes in the verbal root and/or ending have been considered as irregularities in traditional studies of Spanish verbal inflection after 1771, excluding mere spelling changes from the study of verbal morphology, is possibly due to the regularity which has existed between spelling and pronunciation in the Spanish language.

2.2. The various analysis of verbal inflection in Spanish traditional grammar start from a segmentation of verbal forms in a root and an ending; the verbal root carries the lexical meaning and the verbal ending specifies “los tiempos y personas” (the tenses and the persons, cf. next quotation). The Academy (1796:108) formulates it in these terms:

“(…) las letras radicales de los verbos regulares son las que preceden á la terminación del infinitivo.(…) Las letras que exceden á las ya dichas en cada tiempo: forman las terminaciones de los tiempos y personas.”

Elizaga (1881:17 ff), as does the Academy (op.cit.), begins with the division of simple verbal forms into a root and an ending in order to study the Spanish verbal conjugation. Furthermore, Elizaga (op.cit.) segments all simple verbal tenses of the three regular conjugations in a root and an ending and presents the results of his segmentation in a chart (cf. op.cit., pp.19-21). Elizaga attempts to analyze the verbal endings by trying to isolate the recurrent segments, which correspond roughly with the morphs of tense and the morphs of person and number (cf. op.cit. p.21-3). Some years later, Benot (1888-1891, vol. 3, p.19 and pp.37-48) puts forward an analysis of the Spanish verbal inflection, which separates, as does Elizaga, the root
from the ending; but Benot explicitly separates the morphs of person and number from the rest of the verbal ending, and he groups the remaining segments of the verbal ending, according to their formal similarities. Thirty years later, Alonso (1918:57-8, cf. Fig 1 and 2) presents a new analysis of Spanish verbal inflection, in which the morphs of person and number and the morphs of tense and mood are studied separately; in addition, Alonso’s analysis explicitly isolates the thematic vowel in those verbal tenses in which it appears as an independent segment within the ending (cf. Fig.1 and 2).

It is interesting to note that the morphological analysis of the Spanish verbal inflection proposed by Alonso (1918:57-8) within the framework of traditional grammar is more analytic than the analysis offered by structuralism (cf. Bull 1971:38 in Fig.3). As a matter of fact, Bull (op. cit) analyzes simple Spanish verbal forms by separating the root from the ending; furthermore, he analyzes the verbal ending by separating the morphs

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**Figure 1.** Analysis of the morphs of tense and mood ("los exponentes temporales") of the Spanish verbal inflection proposed by Alonso (1918:57).

**Figure 2.** Analysis of the morphs of person and number ("los exponentes personales") of the Spanish verbal inflection proposed by Alonso (1918:58).
of person and number from those of tense and mood. However, he does not analyze the structure of the morph of tense and mood as does Alonso (cf. Fig. 1 and 3). This example, taken from the Spanish grammatical tradition, shows that detailed studies of the inflectional morphology of the Spanish verb were previous to the introduction of the concept of morpheme in Spanish linguistics.

3. Verbs, as well as nouns and adjectives, are found in their canonical form in the EDSFS, that is, verbs are in their infinitive form, and nouns and adjectives are in their masculine and/or singular form. The inflected forms of verbs, nouns and adjectives are obtained by means of programs, which generate an electronic dictionary of inflected forms from an electronic dictionary of canonical forms (cf. 1.). In the System of Electronic Dictionaries of Spanish (SEDS), the programs for the generation of inflected forms, which automatically generate the EDSIFS from the EDSFS, operate on the spelled form of the EDSFS entries. Consequently, our study and classification of the inflectional morphology of verbs, nouns and adjectives, which has been used to codify the EDSFS entries, has been based on the spelled forms of the lexicon of the Spanish language.

In Fig. 4, the list of models of the Spanish verbal inflectional classes is given; this classification of the Spanish verbal morphology has been used to codify the inflectional properties of all EDSFS verbs, regular as well as irregular. The formal schematic specification of the inflectional properties of the 97 verbal inflectional classes of the EDSFS are the following:

1. Regular verbs with spelling irregularities:
   - classes 1-12: verbs of the 1st. conjugation;
   - classes 13-16: verbs of the 2nd. conjugation;
   - classes 17-25: verbs of the 3rd. conjugation;

2. irregular verbs:
   2.1. irregularities in the ending:
     - classes 26-27: verbs of the 2nd and 3rd conjugation;
   2.2. irregularities in the ending and/or the root:
     2.2.1. vocalic changes in the root:
       - classes 28-33: /e/=/ie/;
       - class 34: /i/=/ie/;
       - classes 35-44: /o/=/ue/;

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<table>
<thead>
<tr>
<th>Subject</th>
<th>Indeclive</th>
<th>Future</th>
<th>Preterite</th>
<th>Present</th>
<th>Conditional</th>
<th>Imperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>yo</td>
<td>ere</td>
<td>er</td>
<td>e</td>
<td>e</td>
<td>e</td>
<td>e</td>
</tr>
<tr>
<td>nosotros</td>
<td>eras</td>
<td>eras</td>
<td>eras</td>
<td>eras</td>
<td>eras</td>
<td>eras</td>
</tr>
<tr>
<td>ustedes</td>
<td>estás</td>
<td>estás</td>
<td>estás</td>
<td>estás</td>
<td>estás</td>
<td>estás</td>
</tr>
<tr>
<td>sí, ella</td>
<td>estamos</td>
<td>estamos</td>
<td>estamos</td>
<td>estamos</td>
<td>estamos</td>
<td>estamos</td>
</tr>
<tr>
<td>ellos, ellas, ustedes</td>
<td>estamos</td>
<td>estamos</td>
<td>estamos</td>
<td>estamos</td>
<td>estamos</td>
<td>estamos</td>
</tr>
<tr>
<td>Ud</td>
<td>oye</td>
<td>oye</td>
<td>oye</td>
<td>oye</td>
<td>oye</td>
<td>oye</td>
</tr>
</tbody>
</table>
2.2.2. Consonantal alteration(s) in the root:
- classes 57-59: consonantal change(s);
- classes 60-64: single consonantal increase;
- classes 65-66: double consonantal increase;
- classes 67-68: consonantal change(s) and consonantal increase(s);

2.2.3. Vocalic and consonantal alterations in the root:
- classes 69-70: vocalic change(s) and consonantal increase;
- classes 71-93: vocalic and consonantal changes;

2.2.4. Suppletion:
- classes 94-97

4. Traditional grammar does not provide as precise a description of nominal and adjectival inflection as it does of verbal inflection. Descriptions of the inflectional morphology of nouns and adjectives comparable to conjugation dictionaries are non-existent. Moreover, traditional dictionaries do not provide a systematic morphological description of their nominal and adjectival entries. Consequently, a new classification of the morphological properties of nouns and adjectives in the lexicon of the Spanish language has had to be made in order to codify the inflectional properties of the nominal and adjectival entries of the EDSFS. As in the case of the study of verbal morphology (cf. 3.), spelling has been the point of departure in establishing the inflectional classes of nouns and adjectives, since the programs of automatic generation of nominal and adjectival inflected forms work on the spelled canonical forms of the EDSFS. Consequently, a segmentation of the spelled form of nouns and adjectives in a root, which corresponds to the constant part of the inflected form, and an ending, which corresponds to the part that varies in the gender and/or number inflection, constitutes the base of our morphological analysis. Nevertheless, a problem arises in Spanish by establishing a morphological classification based on the above mentioned criteria: a duplication of regular inflectional classes, which undergo regular spelling changes, unnecessarily complicates the classification in a way which is linguistically inconsistent. Thus, for instance, the
spelling-based classification of masculine nouns creates 40 different spelling classes which correspond to a single regular morphological class, that is, nouns which end in a consonant or an unstressed vowel and form the plural regularly, by adding /-es/, as can be observed in Fig. 5:

<table>
<thead>
<tr>
<th>Category Inflection</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>N - , - , - es , -</td>
<td>alud, aludes</td>
</tr>
<tr>
<td>N án , - , anes , -</td>
<td>huracán, huracanes</td>
</tr>
<tr>
<td>N ogran , - , órganes , -</td>
<td>eslogan, eslóganas</td>
</tr>
<tr>
<td>N aaman , - , ámanes , -</td>
<td>cameraman, cameramanes</td>
</tr>
<tr>
<td>N arman , - , ármanes , -</td>
<td>barman, bármanes</td>
</tr>
<tr>
<td>N ipan , - , ipanes , -</td>
<td>salisipan, salisipanes</td>
</tr>
<tr>
<td>N aasan , - , asanes , -</td>
<td>palasan, palasanes</td>
</tr>
<tr>
<td>N én , - , enes , -</td>
<td>andén, andenes</td>
</tr>
<tr>
<td>N ulden , - , üldenes , -</td>
<td>gulden, güldenes</td>
</tr>
<tr>
<td>N orden , - , órdenes , -</td>
<td>desorden, desórdenes</td>
</tr>
<tr>
<td>N igen , - , igenes , -</td>
<td>origen, origenes</td>
</tr>
<tr>
<td>N argen , - , argenes , -</td>
<td>margen, márgenes</td>
</tr>
<tr>
<td>N olen , - , ólenes , -</td>
<td>polen, pólones</td>
</tr>
<tr>
<td>N amen , - , ámenes , -</td>
<td>examen, exámenes</td>
</tr>
<tr>
<td>N emen , - , émenes , -</td>
<td>semen, sémenes</td>
</tr>
<tr>
<td>N imen , - , ímenes , -</td>
<td>crimen, crímenes</td>
</tr>
<tr>
<td>N omen , - , ómenes , -</td>
<td>dolmen, dolmenes</td>
</tr>
<tr>
<td>N omen , - , ómenes , -</td>
<td>abdomen, abómenes</td>
</tr>
<tr>
<td>N armén , - , ármenes , -</td>
<td>carmen, cármenes</td>
</tr>
<tr>
<td>N ermen , - , érmenes , -</td>
<td>germen, germenes</td>
</tr>
<tr>
<td>N umen , - , úmenes , -</td>
<td>resumen, resúmenes</td>
</tr>
<tr>
<td>N oten , - , ótenes , -</td>
<td>rotén, rótenes</td>
</tr>
<tr>
<td>N uten , - , útenes , -</td>
<td>gluten, glútenes</td>
</tr>
<tr>
<td>N iquen , - , iquenes , -</td>
<td>liquen, líquenes</td>
</tr>
<tr>
<td>N ín , - , ines , -</td>
<td>querubín, querubines</td>
</tr>
<tr>
<td>N itin , - , ítinés , -</td>
<td>mitin, mitines</td>
</tr>
<tr>
<td>N oquin , - , óquines , -</td>
<td>esmoquin, esmóquines</td>
</tr>
<tr>
<td>N omon , - , ómones , -</td>
<td>bombón, bombones; capón, capones</td>
</tr>
</tbody>
</table>

Figure 5. Spelling classes of masculine nouns with number inflection.

Moreover, feminine nouns also constitute 16 spelling classes, which correspond to a single regular inflectional morphological class, that is, nouns ending in a consonant or a stressed vowel, which form the regular plural with the ending /-es/:

<table>
<thead>
<tr>
<th>Category Inflection</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>N - , - , - aés , -</td>
<td>zalá, zalaes</td>
</tr>
<tr>
<td>N - , - , - es , -</td>
<td>verdad, verdades</td>
</tr>
<tr>
<td>N - , - , - iés , -</td>
<td>i, ies</td>
</tr>
<tr>
<td>N - , - , - an , - , anes , -</td>
<td>sobrepán, sobreplanes</td>
</tr>
<tr>
<td>N - , - , - orden , - , órdenes , -</td>
<td>orden, órdenes</td>
</tr>
<tr>
<td>N - , - , - ajen , - , ájenes , -</td>
<td>imagen, imágenes</td>
</tr>
<tr>
<td>N - , - , - argen , - , argenes , -</td>
<td>margen, márgenes</td>
</tr>
<tr>
<td>N - , - , - irgen , - , írjenes , -</td>
<td>virgen, virgenes</td>
</tr>
<tr>
<td>N - , - , - ín , - , enes , -</td>
<td>sartén, sartenes</td>
</tr>
<tr>
<td>N - , - , - ón , - , ones , -</td>
<td>fragmentación, fragmentaciones</td>
</tr>
<tr>
<td>N - , - , - epsilon , - , epsilones , -</td>
<td>epsilon, epsilones</td>
</tr>
<tr>
<td>N - , - , - epsilon , - , epsilones , -</td>
<td>epsilon, epsilones</td>
</tr>
<tr>
<td>N - , - , - ómicron , - , omicrones , -</td>
<td>ómicron, omicrones</td>
</tr>
<tr>
<td>N - , - , - es , - , - eses , -</td>
<td>quermes, quemeses</td>
</tr>
<tr>
<td>N - , - , - ís , - , ises , -</td>
<td>cochevís, cochevises</td>
</tr>
<tr>
<td>N - , - , - ú , - , ües , -</td>
<td>cu, cués</td>
</tr>
</tbody>
</table>

Figure 6. Spelling classes of feminine nouns with number inflection.

The same problem appears with adjectives and/or nouns with gender inflection, which use special endings to mark gender distinctions; the 6 following spelling classes correspond to a single morphological class, that is, the adjectives and/or nouns which form the feminine singular by adding the
ending /-al/ to the base form, the masculine plural by adding /-es/,
and the feminine plural with /-as/: 

N/A ... a, es, as, español, española, españoles, españolas
N/A án, ana, anes, anas, alemán, alemana, alemanes, alemanas
N/A in, ina, ines, inas, bailarín, bailarina, bailarines, bailarinas
N/A ón, ona, ones, onas, faraón, faraona, faraones, faraonas
N/A és, esa, esas, danés, danesa, daneses, danesas
N ós, osa, oses, osas, semidiós, semidiosa, semidióses, semidiosas

Figure 7. Spelling classes of nouns and/or adjectives with gender inflection.

The number inflection of common gender adjectives and/or nouns, which
have no formal variation in their masculine and feminine forms, creates 13
spelling inflectional classes; however, they correspond to one single regular
morphological class, that is, adjectives and/or nouns ending in a consonant
or a stressed vowel, which form the masculine and feminine plural forms by
adding /-es/:

N/... ,es,-, mar, mares
N/A á, a, aes, aes, caiguá, caiguá, caiguées, caiguas
N/A ... ,es,-, sefardí, sefardí, sefardíes, sefardíes
N/A án, án, anes, anas, musical, musical, musicales, musicales
N/A ñ, ñ, enes, enes, hablistán, hablistán, hablistanes, hablistanes
N/A én, én, enes, enes, guardalmacén, guardalmacén,
guardalmacen, guardalmacen; heben, heben, hebenes, hebenes
N/A igen, igen, igenes, igenes, aborigen, aborigen, aborigenes, aborigenes
N/A irgen, irgen, irgenes, irgenes, virgen, virgen, virgenes, virgenes
N/A oven, oven, óvenes, óvenes, joven, joven, jóvenes, jóvenes
N/A in, in, ines, ines, afín, afín, afines, afines
N/A ón, ón, ones, ones, lacedemón, lacedemón, lacedemones, lacedemones
N ós, ós, oses, oses, mandamás, mandamás, mandamases, mandamases
N/A ún, ún, unes, unes, común, común, comunes, comunes
A és, és, eses, eses, cortés, cortés, corteses, corteses

Figure 8. Spelling classes of generically invariable nouns.

As can be seen in Figs. 5, 6, 7 and 8 above, the establishment of inflec­
tional classes of Spanish nouns and adjectives strictly based on spelling
criteria causes a duplication of classes which are morphologically inconsis­
tent. Moreover, this duplication hides the regularity of the spelling
phenomena, which forced us to establish such a high number of morpholog­
ically inconsistent classes: in all the cases considered above, the apparent
spelling irregularities are related to the regular rules that govern the mark­
ing of the phonetic stress in ordinary Spanish spelling (cf. Royal Spanish
Academy 1973:134-144). Note that in all cases considered, the changes of
the written accent can be broken down into three well differentiated clas­
ses:

(1) Nouns and/or adjectives with no written accent change in their
inflection;
(2) nouns and/or adjectives which loose the written accent of the
base form in their gender and/or number inflection;
(3) nouns and/or adjectives which take a written accent, which does
not exist in their base form, in their gender and/or number inflec­
tion.

According to the classification we have just established, the 40 spelling
classes of Fig. 5 can be subdivided in three classes, i.e., (1) nouns and/or
adjectives whose spelling does not change due to accent, (2) nouns that
take a written accent which does not exist in their corresponding base
forms, and (3) nouns and/or adjectives which loose the written accent of
their base forms:

1. N ... ,es,-, alud, aludes
2. N ogan, ,óganes,-, eslogan, esloganes
N aman, ,ámanes,-, cameraman, camerámanes
N arman, ,ármanes,-, barman, bármanes
N ipan, ,ípanes,-, salisipan, salisipanes
N asan, ,ásanes,-, palasán, palásanes
N ulden, ,úldenes,-, guldén, gúldenes
N orden, ,órdenes,-, desorden, desórdenes
N igen, ,ígenes,-, origen, originés
N argen, ,árgenes,-, margen, márgenes
N olen, ,ólenes,-, polen, pólenes
N amen, ,ámenes,-, examen, exámenes
And a similar subdivision into three spelling groups could also be established in the case of adjectives and/or nouns with gender inflection, and also in the case of common gender adjectives and/or nouns which have no formal variation in their masculine and feminine forms, as it is easy to conclude from the examples of Fig. 7 and 8. Consequently, it can be seen that the establishment of inflectional classes based on strict spelling criteria is linguistically inconsistent in Spanish, since it forces us to split up regular morphological classes into subclasses which show regular spelling changes. Therefore, in the inflectional classification of the EDSFS, nouns and adjectives which belong to regular morphological classes and which only present spelling variations of the written accent have been grouped together in single inflectional classes; inside this single class, three different subcodes have been attached to its members according to the spelling variation of the written accent, following the classification that has been previously established:

(1) the subcode A has been attached to entries that present no accent change, but belong to a morphological class which presents orthographic accent variation; thus for instance, libertad (liberty), which belongs to the inflectional class 22 (cf. Annex), presents no accent change in its plural form libertades; nevertheless, it has been marked with the subcode A, since it belongs to a class that presents orthographic accent variation, as will be seen in (2) and (3) below;
the subcode $B$ has been attached to entries that lose the orthographic accent of the base form; thus, atracción (attraction), which belongs to the inflectional class 22, like libertad, has been marked with the subcode $B$, because the plural form atracciones (attractions) loses the orthographic accent of the base form; the subcode $C$ has been attached to entries that take an orthographic accent that did not exist in the base form; thus, virgen (virgin) is marked with the subcode $C$, because the plural form virgenes (virgins) takes an orthographic accent which does not exist in the base form.

Thus, in the EDSFS, libertad, atracción and virgen have the same inflectional code, i.e., 22; the subcodes $A$, $B$, and $C$ specify the spelling changes due to accent of each entry within the morphological class. Consequently, the actual format of the above mentioned entries in the EDSFS is the following:

libertad, N22A
atracción, N22B
virgen, N22C

The program for the generation of nominal and adjectival forms of the SEDS has a subroutine, which automatically assigns the orthographic accent of the generated forms in keeping with the subcode of the corresponding morphological class. Codifying orthographic accent changes within single morphological classes allows to reduce the 157 strict spelling inflectional classes of the Spanish language to a final classification made up of 62 classes (cf. Annex)

**ANNEX**

Nominal and adjectival inflectional classes of the EDSFS

1. Masculine nouns

<table>
<thead>
<tr>
<th>Code</th>
<th>Inflectional Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>N0</td>
<td><em>,-</em>,-</td>
</tr>
<tr>
<td>N/A1</td>
<td><em>,-</em>,-</td>
</tr>
<tr>
<td>N/A2</td>
<td>*,-es,-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Example</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>gentilhombre, gentíleshombres</td>
<td>friendly, friendly</td>
</tr>
<tr>
<td>libro, libros; A1S: buen</td>
<td>book, books; A1S: well</td>
</tr>
<tr>
<td>N2A: alud, aludes; N2B: capón, capones; N2C: examen, exámenes</td>
<td></td>
</tr>
</tbody>
</table>

2. Feminine nouns and/or adjectives

<table>
<thead>
<tr>
<th>Code</th>
<th>Inflectional Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A20</td>
<td><em>,-</em>,-</td>
</tr>
<tr>
<td>N21</td>
<td><em>,-</em>,-</td>
</tr>
<tr>
<td>N/A22</td>
<td><em>,-</em>,-</td>
</tr>
<tr>
<td>N/A23</td>
<td><em>,-</em>,-</td>
</tr>
<tr>
<td>N/A24</td>
<td><em>,-</em>,-</td>
</tr>
<tr>
<td>N/A25</td>
<td><em>,-</em>,-</td>
</tr>
<tr>
<td>N/A26</td>
<td><em>,-</em>,-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Example</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIA20: <em>,-</em>,-</td>
<td>casa, casas; tetuda, tetudas</td>
</tr>
<tr>
<td>NIA21: <em>,-</em>,-</td>
<td>soleá, soleares</td>
</tr>
<tr>
<td>NIA22: <em>,-</em>,-</td>
<td>flor, flores; N22B: zalá, zalaes; N22C: virgen, virgenes</td>
</tr>
<tr>
<td>NIA23: <em>,-</em>,-</td>
<td>lilac, lilales</td>
</tr>
<tr>
<td>NIA24: <em>,-</em>,-</td>
<td>dosis, dosis; N24P: sobras</td>
</tr>
<tr>
<td>NIA25: <em>,-</em>,-</td>
<td>my, mies</td>
</tr>
<tr>
<td>NIA26: <em>,-</em>,-</td>
<td>cruz, cruces; excitatriz, excitatrices</td>
</tr>
</tbody>
</table>

3. Nouns and/or adjectives with gender inflection

<table>
<thead>
<tr>
<th>Code</th>
<th>Inflectional Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A27</td>
<td><em>,-</em>,-</td>
</tr>
<tr>
<td>N/A28</td>
<td><em>,-</em>,-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Example</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A27: <em>,-</em>,-</td>
<td>hijodalgo, N27FS: hijadalgo, N27MP: hijosdalgo</td>
</tr>
<tr>
<td>N/A28: <em>,-</em>,-</td>
<td>caballo, caballos; N28F: yegua, yeguas</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Example</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>N27MS: N27FS: N27MP: N27FP: hijodalgo</td>
<td></td>
</tr>
<tr>
<td>N28M: N28F: yegua, yeguas</td>
<td></td>
</tr>
</tbody>
</table>
N29 *.*,s,*es,
N29M: hombre, hombres; N29F: mujer, mujeres
N30 *.*,*es,*s,
N30MB: cabrón, cabrones; N30F: cabra, cabras
N31 *.*,*es,*es,
M31MB: varón, varones; N32FA: mujer, mujeres
N32 a,isa,as,isa,
poesía, poeta, poetas, poetisas
N33 *,esa,es,esas,
N33A: abad, abadesa, abades, abadesas;
N33B: barón, baronesa, barones, baronesas;
N33D: cónsul, consulesa, consules, consulesas
N/A34 *,a,es,as,
N/A34A: español, española, españoles,
estro, española, españoles; N/A34B: alemán, alemana,
alemanes, alemanas
N/A35 e,a,es,as,
monje, monja, monjes, monjas; regordete,
regordeta, regordetes, regordetas
N36 e,esa,es,isas,
sacerdote, sacerdotisa, sacerdotes,
sacerdotisas
N37 *.,sa,ss,ss,
duque, duquesa, duques, duquesas
N38 eroe, eroina, eroes,
eroe, eroina, eroes, eroinas,
héroes, heroina, heroínas
N39 que, ca, ques, cas,
cacique, cacica, caciques, cacicas
N/A40 i,ina,inos,inas,
tuneci, tunecina, tunecinos, tunecinas
N41 i,ina,ies,inas,
jabalí, jabalina, jabalies, jabalinas
N42 i,la,las,
doncel, doncella, donceles, doncelas
N43 i,isa,es,isas,
N/A44 o,a,os,as,
niño, niña, niños, niñas; bueno, buena,
bueno, buenos, buenas; A47P: ambos
N45 o,ina,inos,inas,
gallo, gallina, gallos, gallinas
N46 o,esa,os,esas,
diablo, diablesa, diablos, diablesas
N47 *.,ina,es,inas,
zar, zarina, zares, zarinas
N/A48 dor,triz,dores,trices,
emperador, emperatriz, emperadores,
emperatrices; fulminador, fulminatrix,
fuminadores, fulminatrices
N/A49 or,riz,ores,rices,
actor, actriz, actores, actrices; bisector,
bisectriz, bisectores, bisectrices
N50 y,ina,yes,inas,
rey, reina, reyes, reinas

VERBAL NOMINAL AND ADJECTIVAL INFLECTION

N/A51 z, za, ces, zas, andaluz, andaluza, andaluces, andaluzas
A52 e, a, os, as, ese, esa, esos, esas
A53 la, los, las, aquel, aquella, aquellos, aquellas
A54 a, os, as, A54B: algún, alguna, algunos, algunas

4. Generically invariable adjectives and/or nouns
A55 *.*,.*,.*
cualquier, cualquier, cualesquier, cualesquier
N/A56 ...,s,s,
A56A: artista, artista, artistas, artistas;
diferente, diferente, diferentes, diferentes
N57 ...,s,s,
A57A: agua, aguas
N/A58 ...,es,es,
N/A58A: sefardí, sefardí, sefardies, sefardies;
A58A: musical, musical,
musicales, musicales; N/A58B: caiguá,
caiguá, caiguas, caiguas; N/A58C: joven,
joven, jóvenes, jóvenes; A58S: parisien
N/A59 ,,,,,
gilipollas, gilipollas, gilopollas, gilopollas;
N59P: consortes
N60 ...,es,s,
N/A61 z, z, ces, ces,
N61A: juez, juez, jueces, jueces; feliz, feliz, felices,
felices

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NOTES

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2) The SEDS uses the programs for the generation of inflected forms of the DELA System; these programs were written and adapted to Spanish by Blandine Courtois.

3) /y/ is used to represent the Spanish voiced palatal fricative.

4) Underlined in the original.

5) Gross (1977:16) points out the difficulties in defining the concept of morpheme, and in establishing a distinction between word and morpheme.

6) The following notational conventions are used in the presentation of the inflectional classes:

- suppletive distribution between the masculine/feminine and/or the singular/plural forms
- non existent forms
- unspecific ending

M masculine
F feminine
S singular
P plural.

7) The accentuation subroutine of the program for the generation of nominal and adjectival inflected forms was written by Blandine Courtois.

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Villar, Ivan. 1651. *Arte de la lengua española. Reducida a reglas, y preceptos de rigurosa gramatica, Con notas, y apuntamientos utilísimos para el perfeto conocimiento de esta y de la lengua latina*. Valencia: Francisco Ver­engel.

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**SUMMARY**

A general classification of the inflectional classes of verbs, nouns and adjectives in the lexicon of the Spanish language is presented in this article. This classification has been used to codify the inflectional properties of the verbal, nominal and adjetival entries of the Electronic Dictionary of Simple Forms of Spanish.

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