Frame models in Physics and English Language

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Abstract. Frame models have become a means to structure information from educational texts in a logical way in a number of fields like physics, math, English language, etc. In the present work, frame models have been introduced in studying situations related to word formation like "word formation" frame, „root of a word unit", "word formation order 1 -> 2 -> 3". Studying word formation by frames helps the teacher to classify well the educational content as well as helps the students to complete self-study tasks in similar situations. This approach is particularly appropriate to be applied in e-learning systems.

Keywords: frame models, word formation, language learning, e-learning.

1. FRAME MODELS AS AN EDUCATIONAL APPROACH

The choice of a methodical approach when presenting any educational content is not an easy task and is frequently based on the methodical experience and personal preferences of the teachers themselves. Structuring educational content by applying a formalized method would assist into using a generalized technique in similar situations and would bring to more effectively achieved educational goals. In the nowadays technological era, there is an increased necessity of one and the same method in order to structure didactic content. Generalizing and classifying knowledge, which can be studied by frames, helps to unify the learning content approach in different subjects and increases the level of memorizing information by the learners. This method will not only upgrade the educational process, but also will suggest an algorithm of presenting and structuring it, as well as make studying easier and faster to absorb information at the different cognitive levels rather than now. (Gurina, 2007)

The term "frame" was first introduced by Minsky (1974) in artificial intelligence. He used it classify objects, events, processes, etc. and categorize them into different frame subcategories, which are called slots. Each slot contains specific and typical information about the object studied. The e-resources VerbNet and FrameNet, which in a similar way offer a manner of classifying knowledge only about linguistic categories based on their semantic characteristics. They offer a great variety of information related to language learning (especially English) by classifying lexical units into interconnected groups based on different features (conceptual, semantic, lexical, structural, etc.).

The pedagogical experience has shown that in a number of experiments conducted in the traditional language learning, "frames" are used by Gurina (2007). They describe the positive effect of integrating this methodical approach in the education such as: formalization; structuring; summarizing; introducing information; storage of information; systemizing the content; visualizing (with tables, schemes); increased memory and better cognitive functions. All of the mentioned above gives reasons to form the **hypothesis** that using the frame approach in education and classifying learning content in the different slots would make the teacher's

job easier and increase the effectiveness in memorizing in the very educational process.

2. WORD FORMATION FRAME MODELS IN ENGLISH LANGUAGE

The frame is a structure by which the students learn the typical characteristics of a learning unit. In the process of studying linguistic units in foreign language learning, they are logically classified by a certain algorithm, which focuses the students' attention on important knowledge elements. (Brent, 1991). Defining those elements into types will not only help the studying sequence, but also gives an opportunity for self- studying in analogical or similar structures.

Word formation is one of the basic linguistic approaches when studying a linguistic category. Using a frame model would assist into easily transforming one lexical category into another and stating its grammatical specifics. This will not only enrich the learners' theoretical knowledge of how to characterize them, but will also lay the foundations to excel in the vocabulary of a certain foreign language.

Studying a word unit from a text by a word formation frame will visualize how exactly each form changes while being transformed into another lexical category (noun, verb, adjective, adverb), what prefixes and suffixes are to be used and what is the word root. Describing all that in sequence in a table will organize the vocabulary knowledge in order and will generate a sample of a similar approach in identical educational situations.

TABLE 1 shows the frame content "root of a word unit", which categorizes a word from a text and its root.

Slot name	***Slot content***
Word*	**The word from the text**
Grammar category*	verb / noun / adjective / adverb
Meaning*	Definition according to dictionary
Transcription	Manner of pronunciation
Prefixes*	List of prefixes (if available)
Suffixes *	List of suffixes (if available)
root*	**of the word from the text**
Grammar category (of the root)*	verb / noun / adjective / adverb
Meaning*	Definition according to dictionary
Transcription	Manner of pronunciation

*- marks the obligatory slots

TABLE 2 demonstrates "a word formation" frame and classifies the content of two random word forms, which are formed out of the word root of the above word unit.

Slot name	***Slot content***
Word 1*	**Formed from the word in the text**
Manner of pronunciation *	verb / noun / adjective / adverb
Meaning *	Definition according to dictionary
Transcription	Manner of pronunciation
Grammar category – verb:	to + infinitive
Verb forms	Present/past/future form, third person
Synonym	Synset – word similar to meaning
Antonym	Opposite word in meaning
Type	Stative verb; Dynamic verb
Transitivity	Transitive; Intransitive
Prefixes	List of prefixes (if available)
Suffixes	List of suffixes (if available)
Word 2*	**Formed from the word in the text**
Grammar category*	verb / noun / adjective / adverb
Meaning *	Definition according to dictionary
Transcription	Manner of pronunciation
Prefixes	List of prefixes (if available)
Suffixes	List of suffixes (if available)

TABLE 3 shows a frame of "word formation order 1 -> 2 -> 3->4…"" where at least three consecutive forms are classified, which are formed by the word root in Frame 1.

Slot name	***Slot content***
root*	**of the word from the text**
Word 1*	**From the root**
Grammar category*	

Meaning *	
Transcription	
Prefixes *	
Suffixes *	
Word 2*	
Grammar category*	
Meaning *	
Transcription	
Prefixes *	
Suffixes *	
Word 3*	
Grammar category*	
Meaning *	
Transcription	
Prefixes *	
Suffixes *	

TABLE 4 describes the complete word formation paradigm" of the word from the text starting with the root.

Slot name	***Slot content***
root*	**of the word from the text**
Word 1.	
Word 1.1.	
Word 1.2.	
..	
Word 2.*	
Word 2.1.	
Word 2.1.1.	
Word 2.1.2.	
…	
Word 3.*	
Word 3.1.	
Word 3.2	

3. COMMENTS AND CONCLUSION

Describing word formation process by the above frame models, offers a sample which may function as an example of developing similar word forms from different texts. Frames could be a firm basis for self-studying as well as of generating word formation tasks in order to check and assess the knowledge, skills and habits of the students. (Totkov et al., 2017) By visualizing the word formation process in a table, the student is given the chance to form a new word unit from the one in the text, from its root or from a complicated word using different suffixes and prefixes by following the simple steps in the frame slots.

Frame models are a methodical approach, which may be used both as a basic or accompanying educational method. They suggest a generalized technique to be used in any kind of educational content like maths (Totkov et al., 2017), physics, etc. and in this case with word formation. Frames may be beneficial to the teachers when creating the curriculum as well as be used to generate testing tasks to check and assess the gained knowledge.

This frames approach can be successfully applied in traditional learning as well as in e-learning systems in case of a self-study and solving practical tasks. On the other hand, frames can be appropriately multiplied in different subject areas like maths, physics, etc. as well as in foreign languages with rich vocabulary like English, Bulgarian, German, etc.

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