Table 2 Classification of the most common causes of not acceptance of crossword terms and definition clues made by students

#	ET	Error Type	Detailed	Examples
1	WST	Wrong Spelling of Term	Wrong spelling of the term	e.g.: **NERST** instead of NERNST
2	RPT	Repeated Term	The term to be defined, or a part of it, is contained in the definition too.	e.g.: ISOELECTRIC**POINT** = "***point*** *where (+) and (-) charges are balanced*"
3	WCT	Wrong Choice of Term	The less specifying attribute in a compound term is chosen as the term to be defined.	e.g.: **RAPIDITY** in response (of a probe) instead of the term RESPONSE
4	WD	Wrong Definition	Definition is simply false if referred to that term.	e.g.: POTENTIOMETER = device for measuring **power**.
5	SWC	Sentence Without Clue	Assertion doesn't lead to any term to find.	e.g.: NOBLE = *platinum is one of most expensive metals in the world*
6	OCD	Out of Context Definition	Definition relies in the same general science subject but does not use relations of that term with other concepts of its context	e.g.: LITHIUM = *first metal in the table of the elements* instead of *migrant ion in a special glass membrane for pH probe*
7	WC	Wrong Context	Improper context use for that term or concept	e.g.: MEMBRANE (a glass component in pH probe) = *a kind of **pump***
8	CSD	Common Sense Definition	Definition based on common sense-meaning instead of scientific one.	e.g.: SATURATED (of a filling solution for electrodes) = *synonym of **full***
9	PSD	Poor Sharpness of Definition	Vague definition; insufficient data to infer crossword; too loose context.	e.g.: "*As can be a reaction*" e.g.: ROSS = "***electrode** with short response time*", instead of "*pH electrode that…*"
10	ND	Nested Definition	Some terms used in the definition have to be inferred from another definition	e.g.: "*law that gives potential of a device formed of two electrodes...*" instead of: "*law that gives potential of a cell*".
11	SCD	Sub Categorical definition	Concept defined from a particular example of it.	e.g.: CELL = "*named Daniell when a copper foil is soaked in a solution of CuSO$_4$*"

Table 2 labels and describes the most common errors, limitations and defects found in the students definition clues. Teachers would proofread and evaluate definitions, writing acronyms of table 2, then would return them to students for adjustments (students have a copy of table 2 with examples for a better understanding of errors). Students would re-write defective definitions (and terms to be defined, in a few circumstances). At last executable crosswords would be loaded in the website. Not only does the software help students to study the subject with fun, but it also supports concept mapping on the very subject. During the revision-evaluation process the mediation of the teachers is very important: students can reason over meanings, can construct mini-cmaps (like "big-nodes") and place concepts in a proper context. Students would deal with metacognition too, meditating how other people have to think to recover terms from clues.

Errors of table 2 can be regarded as rules for making good (and meaningful) definitions. Some of them coincide with rules used in concept mapping. For instance: the search for relations with other related concepts; never uses the same concept in two or more nodes; or defines a concept by relating it to more inclusive concepts or attributes of the same hierarchical level, rather than specifying examples. Definitions would keep a denotative and connotative relation with the concept rather than an associative bond. So we should accept that some crosswords in the grid are repeated in other clues. Furthermore, making clues speeds up assimilation of key concepts of that knowledge domain, and increases awareness in the conceptual structure of the subject, meant as relations among domains, sub-domains and nested contexts. We hope that this induced contextualization would both develop students awareness of inclusive concept to chose, and make more meaningful concept maps.