INDICATOR FOR TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) EVALUATION OF ONLINE TASKS

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ABSTRACT

In the Information Communication Technology era teachers will have to wisely use the online environment in order to realize a new pedagogy. The penetration of the internet and collaborative online instruments to teaching and learning affect the quality of teaching. We have developed a digital indicator evaluate the quality of the online tasks in terms of content knowledge, pedagogical knowledge, technological knowledge and technological pedagogical content knowledge (TPACK). The score for the task is obtained immediately, with emphasis of its weaknesses and strengths. The indicator was used to examine 53 online tasks that were created by teachers from 2001 to 2007. We found that teachers can use this indicator for evaluating the quality of the tasks that were developed as well as to test the improvement that took place in their tasks over time.

Keywords: **Digital indicator, Online tasks, TPACK, Evaluation, Technology knowledge, IT skills, Professional development**

INTRODUCTION

Life in the computerized world, which is characterized by the penetration of information technologies and which changes rapidly, is affected in many fields. The penetration of the internet into different fields of teaching and learning may have a significant effect on the quality of teaching. Numerous researchers claim that time is needed in order to examine the real effects of technology on pedagogy (Gao et al. 2006; Hui et al. 2005) and on the teachers in the field "to harness the horses of technology to the cart of pedagogy" (Noski et al. 2006). However, the new learning environment must be created on a rational pedagogical basis and not only on a technological basis (Salomon 2000).The theoretical part of this article describes online learning, the characteristics of knowledge required of teachers who integrate technology in teaching, the characteristics of an online task, and various indicators for evaluating an online task. Because we did not find a dynamic and digital indicator for evaluating the quality of online tasks which encompasses all of the aspects which in our opinion should be expressed in an indicator, such as PK, PCK, TK and TPACK, which is actually the space expected to be expressed in an online task, we developed a digital indicator that evaluates the quality of online tasks.

The goal was to develop a unique indicator that would reflect the quality of online tasks with reference to technological pedagogical content knowledge (TPACK).

The indicator is described in detail together with the considerations that were taken into account during its construction. The processes by which its validity and reliability were tested are also described.

THEORETICAL FRAMEWORK

Mishra and Koehler (2006, 2009) talk about teachers in the online environment, i.e. teachers who develop online learning environments must have technological knowledge as well as technological pedagogical knowledge. The online environment has the additional advantage of a high potential for learning and enrichment of the user also outside the school (Parsad et al. 2005). Online teaching has the potential for supporting meaningful learning, in which the student is active and acquires high-order cognitive skills such as carrying out generalizations, asking questions, expressing a well-argued opinion, making comparisons or solving problems (Capper, 2003; Herrington et al. 2005; Linn et al. 2004). Salomon (2000) presents a vision in which use of technological tools will comprise a lever for the implementation of meaningful learning, where technology will be at the disposal of pedagogy and will help in its realization. The integration between a pedagogical rationale and technological tools enables the exposure of the student to rich and diverse information, enables dealing in complex contents that are relevant to the student and enables experience in constructing rich and original products based on the newly acquired knowledge. This is learning that encourages cooperation through a meaningful educational dialogue with the teacher and with peers, via the technological tools (Roschelle 2000; Lehtinen et al. 1998). Technology also enables support of the learning process by means of intertwined evaluation that improves the process and directs the student's activity (Dori 2003; Shepard 2000).

KNOWLEDGE ATTRIBUTES OF TEACHERS WHO INTEGRATE TECHNOLOGY IN TEACHING

The concept technological pedagogical content knowledge (TPACK) expresses the space created between the technological knowledge, the pedagogical knowledge and the content knowledge.

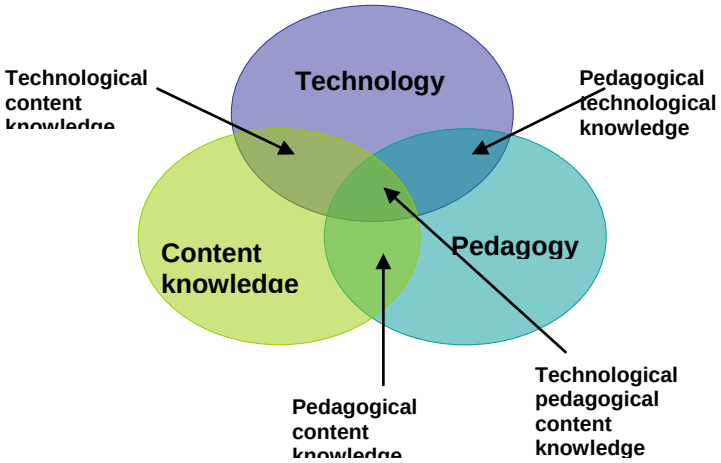

Figure: 1
TPACK – the space created between the technological knowledge, the pedagogicalknowledge and the content knowledge (Mishra and Koehler 2006, 2009)

This concept is based on Shulman's concept of PCK – pedagogical content knowledge. Shulman talks about the attributes of knowledge required of teachers who integrate technology in teaching, while referring to the complexity and the knowledge of the teachers in their field.

Figure.1 describes the complexity and the relations between content knowledge (CK), pedagogical knowledge (PK) and technological knowledge (TK). The correct combination of technology in pedagogy in a particular subject must take into account the dynamic combination between the components and the intersections between them.

A teacher who can navigate between these interrelations represents an expert who is different from an expert only in the disciplinary field of knowledge, only in the technology field of knowledge or only in the pedagogical field of knowledge (Mishra and Koehler 2006, 2009).

CHARACTERISTICS OF AN ONLINE TASK

One of the school's goals is to afford a pedagogical answer to the needs of the internet generation students. The learners' tasks should be relevant, innovative and attractive, thus increasing the relevance of the school for the learners and for society after a long time in which it decreased, since the early 1980s (Condition of Education, 2002).

An online learning activity is a learning activity in which online tools found in an online environment are exploited and can deal in a content field from the school curriculum. The online task must combine the development of thinking and computerized information skills such that the learners will make effective, wise and valuable use of the internet for their learning (Rotem and Peled 2008).

The online task must be dynamic, challenging to the student and enable understanding the contents by creating the proper connections (Selant 2007). The complexity of the online learning task (beginning with a simple worksheet on the internet) is derived from the task's pedagogical goals. The online activity can be carried out by personal or group learning, where the learner experiences different learning than in the traditional lesson.

Online learning is not intended to replace traditional learning, but rather to demonstrate a new, interesting, challenging aspect that affords the learner a possibility for developing independent learning connected to the infinite information on the internet, while knowing what is important. The concept of an online learning task is a generalized name for the conduct of a lesson on the web as independent individual learning or as team learning (Rotem and Peled 2008).

The online learning task is realized in a learning environment which has online tools via the internet and ensures:

- **Accessibility to information (human or technological);**
- **Retrieval of information according to context and need;**
- **Interpersonal communication for purposes of learning and personal empowerment, which is not limited to place and time;**
- **Reception of information in a digital text in a diversity of possible modalities;**
- **Creative information output which reflects the knowledge acquired and created in the learner, via a digital text.**

Or Meir (2005) defined the characteristics of the online learning task that in her opinion should be in every online learning task: Congruence with the school curriculum; Adaptation of the task to the learners' attributes; The skills required of the student are clearly defined and are achievable; Time: the task can be completed during the school day or at home; Place: the task can be completed within the school walls or outside the school; Organization of learners: the task can be performed individually or by teamwork and referral to online sites and materials;

In her opinion, the components of the online task are: Title and subject of the task; Clear and achievable goals; Item of information that contains basic knowledge on the task's subject; Short description of the task and what is required of the learner; Explanations for performing the task from the content aspect and from the technological aspect; Mode of communication with the teacher/peers/experts – email, forum or chat; Links to relevant sources of information on the internet; Clear definition of the product expected of the student and suggestions for different ways of evaluating the process and the product.

INDICATORS FOR EVALUATING ONLINE TASKS

An indicator is a systematic and focused tool that reflects, sets, details and organizes the measures and criteria for evaluating. Use of an indicator attempts to reduce the disadvantages of subjective evaluation instruments without losing their advantages (Smith 2004). The indicator indicates what is taken into account and what determines the grade (Goodrich 1997; Wilson 1994). Accordingly, the indicator teaches what is evaluated and enables learning the criteria for optimal evaluation. There exists difficulty in ensuring reliable, fair and valid judgment of complex, multi-dimensional tasks with several response possibilities. The indicator affords a solution for this difficulty: in order to obtain fruitful feedback on the learning and teaching process, and in order that the evaluation will be reliable, valid, constructive and fair to the student, it is important to rely on a multi-dimensional evaluation indicator which contains detailed criteria according to which the student will be evaluated regarding a particular task (Birenboim 1997).

Online learning is essentially different from face-to-face learning and obligates different methodologies for evaluating learning processes. Within the various in-service training frameworks, we did not find indicators that encompass and exhaust the measures which in our opinion should be included in an online task. There exist various indicators that evaluate online tasks, but we did not find an indicator that was validated and examines the measures and criteria necessary for turning an online task into a task that meets all the requirements at their best, i.e. an indicator that evaluates the space created in a task between technological content knowledge, pedagogical knowledge and content knowledge.

For example Or Meir (2005) presents a list of the characteristics of an online task. When evaluating a task according to Or Meir, one must indicate only whether or not a component exists in the task. The components she indicates are: "integrative task that requires performing connections between separate parts of the curriculum; task that enables different solutions and evokes pluralistic thinking; task in which the learners must identify and formulate the problem/dilemma which is presented; task that enables the learners to work together out of a need that stems from the scope of the task and from the opportunity to present several points of view; task that requires planning an expected course of performance; task that enables choice for the learners, making decisions and control of their work; task that obligates the learners to use online databases and different sites on the internet; task that develops know-how

skills in the learners; task that connects to the learners' real world, has meaning for them, where they required to solve problems that are real in their reality of life; task in which the learners are required to carry out integration between prior and new knowledge and task that affords an opportunity for self-evaluation and reflection."

Another example of an indicator that evaluates an online task is an indicator which includes six measures (exploiting technology, the required level of thinking, the extent of collaboration, the closeness of the contents to the learners' world, direction towards rich products and intertwined evaluation). Such an indicator comprises a measure of good teaching, according to the social-constructivist worldview. Three levels of performance were defined for each measure: At the highest level of performance the teacher acts according to the principles of the social-constructivist approach and exploits the added value of technology for pedagogy.

At the medium level of performance there exists an attempt to exploit the added value of technology for pedagogy, but the activities do not indicate a fundamental change in teaching. At the low performance level technology is used as an instrument that supports the traditional teaching and evaluation methods (Inbal-Shamir and Kelly 2008). An example of a more detailed indicator that includes three levels of performance includes the following measures: point of origin for the task, use of the internet, adaptation of the activity to the properties of the tools, thinking levels, solution for heterogeneity, textual design, use of internet communications tools, contribution of the computer to the learning process, definition of the product, correlation between the product and the task, adaptation of the learning product to the computerized tools and mediation of the task. The three levels of performance for these measures are: usually not, usually and optimal. There is no quantification for each level of performance (Nashi and Doron 2008). Cohen et al. (2008) developed a collaborative digital "computerized performance meter" indicator. This indicator is unique in that several evaluators evaluate the same online task.

In the collaborative performance meter each criterion must be ranked on a scale between 0 and 4. There is no detailing of the performance levels of each of the scales and there is no function that calculates the final score for the task.

In our opinion, these indicators (Cohen et al. 2008; Nashi and Doron 2008; Or Meir 2005) lack additional criteria from the field of content knowledge and the field of pedagogical content knowledge and/or do not have clear performance levels. Indicator for evaluating improvement of the online tasks We did not find a dynamic and digital indicator for evaluating the quality of online tasks which encompasses all of the aspects which in our opinion should be expressed in an indicator, such as pedagogical knowledge, pedagogical content knowledge, technological knowledge and pedagogical technological content knowledge.

Therefore, we developed a digital indicator that evaluates the quality of online tasks. The indicator was constructed based on an instrument for characterization and evaluation of online tasks (Rotem 2006).

DESCRIPTION OF THE DIGITAL INDICATOR

The digital indicator evaluates and characterizes a task according to compulsory and optional measures and according to internal criteria. The measures are: components of the learning task, pedagogical knowledge, pedagogical content knowledge, technological knowledge and technological pedagogical content knowledge (Table: 1).

Table: 1
Characteristics of the indicator for evaluating the quality of an online task

Measures	**Compulsory**
Components of the learning task	
General didactics (pedagogical knowledge)	
Pedagogical content knowledge	
Implementation of teaching in an online environment (technological knowledge and technological pedagogical knowledge)	
Originality and representations	**Optional**
Collaborative learning	
High-order cognitive skills and affording a solution for heterogeneity	
Use of the online task	

The compulsory measures include the components of the learning task, general didactics (pedagogical knowledge), pedagogical content knowledge and implementation of teaching in an online environment (technological knowledge and technological pedagogical content knowledge).

The components of the learning task deal in the pedagogical field: the framework of the task, details of the prior knowledge required of the student, the learning goals in the content field and the goals of skills of using an online environment, an introduction to the task in which a general description of the task's content is described, its importance and its relation to the subject and the expected manner in which the learner is expected to act, clear work instructions that are understandable to the learner and a clear and detailed definition of the required product.

General didactics (pedagogical knowledge) deals in: adaptation to the target audience, adaptation of sources to which the task refers, affording a solution for the heterogeneity of the students in the learning process, the readability and clarity of the language in the texts of the task or to which the task refers, inviting meaningful learning, encouraging creativity/originality of the learner, the interactivity of the task and the development of IT skills.Pedagogical content knowledge deals in congruity with the curriculum in the content field, and in ways for representing the information that are appropriate to the field of knowledge and the subject of the task.

Technological knowledge and technological pedagogical content knowledge, i.e. implementation of teaching in an online environment deals in added value of the digital text and online environment, diverse means of illustration and expression, designing the task in a digital format, orientation and clarity of navigation, organization of the information in the digital format, and meeting the rules of ethics on the internet.

The optional measures include originality and representations of the task, collaborative learning, high-order cognitive skills and affording a solution for the heterogeneity of the students and the use that can be made of the online task. The compulsory measures are the core of the task. In spite of the great importance which we attribute to the optional measures, we did not include these in the core at this stage, out of familiarity with the learning environment in the school and the teachers' mastery of the technologies. In the years 2001-2007, during which the tasks were constructed, the teachers did not use collaborative learning because web2 technology was not yet in use in the education system and platforms of collaborative learning had not yet been introduced in teachers' training curricula.

Criteria such as collaborative learning and development of high-order cognitive skills were therefore included in the optional measure. Most of the optional measures are another stratum, in addition to the core measures which are an essential element. For example, the pedagogical knowledge, which is compulsory, includes creation of new knowledge and creativity, which actually represent high-order cognitive skills and we regarded them as criteria that must appear in the compulsory part of the indicator. The criteria included in the optional measure of high-order cognitive skills offer other cognitive skills that can in our opinion appear in an online task but are not essential.
The optional measures are:

Originality and representations deal in the adaptation of the product to the heterogeneity of the students, the originality of the task and the absence of any stereotypes.

Collaborative learning deals in the construction of shared knowledge, realization of shared instruments, shared learning product, open communication between learners, self-evaluation and collaborative of learning, and the active presence of the teacher during the course of collaborative learning. Learning at high-order cognitive skills and affording a solution for heterogeneity deals in high-order cognitive skills and open learning situations.
Use of the online task deals in adaptation to learning in additional contexts, whether the resources needed for performing the task are standard, accessible and available, and whether accessibility exists for the disabled.

Each criterion has three levels of performance standards: 1– low; 2– medium; 3– high.

We also added a measure of an evaluator's evaluation.
The research questions

- **Is the indicator that was developed for evaluating online learning tasks reliable?**
- **Does the indicator that was developed evaluate the quality of the online task?**

METHODOLOGY

The research instruments

A digital evaluation indicator was developed and adapted for this research (see appendix 1), which was constructed based on the "megalithic model" (Rotem 2006). The megalithic model is intended to characterize and evaluate an online task according to foundation stones, covered by top stones. The foundation stones deal in the learning content, didactic realization, realization of online tools and digital text and the personal learning enabled by the task. The top stones deal in collaborative learning, high-order personal learning and the possibility of reconstructing and replicating the activity in other contexts. We performed several processes in order to adapt and validate the megalithic model:

- **Evaluating different indicators found in the literature.**
- **Development and adaptation of the indicator based on the megalithic model and findings of the literature search.**
- **Organization of the indicator according to compulsory and optional measures, and according to criteria and performance levels. The indicator was constructed such that is could be used for both research purposes and as an indicator for evaluating online tasks.**

- **Evaluating identical online tasks using the indicator (each task was evaluated by each of the researchers).**
- **Improving and pinpointing the measures, criteria and performance levels that were found vague and were not understood identically by the investigators.**
- **Additional evaluation of identical tasks by both researchers**

We examined content validity, i.e. whether the indicator meets criteria of common sense. Construct validity: a meticulous examination of a clear relation between the evaluation instrument and the theory on which the quality of a computerized task is based. The indicator that was developed contains 42 measures and criteria of four orders:

- **Thirty-one first order (criteria).**
- **Seven second order (measures of the learning task, general pedagogical knowledge, pedagogical content knowledge, technological content knowledge (implementation of teaching in an online environment), originality and representations, collaborative learning, high-order cognitive skills and affording a solution for the heterogeneity of the students and use of the online task.**
- **Three third orders (compulsory measures, optional measures and the evaluator's general evaluation).**
- **A summarizing measure of the fourth order (summarizing score for the task).**

The two investigators evaluated online tasks using the digital indicator and tested the examined criteria according to customary characteristics of a quality online task in the literature. Each criterion in the indicator has three levels of performance: low, medium, and high.

Testing the reliability of the indicator

Testing the reliability of the digital indicator for characterizing and evaluating an online learning task was performed by comparing the evaluation scores of the investigators. We examined reliability using the method of reliability as stability – the extent to which repeated measurements, under identical conditions, led to similar results, inter-rater reliability, i.e. whether different evaluators obtained similar results. Each task that was evaluated within the framework of the study was evaluated by each of the investigators separately. Since this research is part of a more comprehensive research, the tasks were tested at two points of time in order to also test the improvement of the tasks over time.

The research population

Fifty-three online tasks were collected, which were developed by 14 high school teachers in different disciplines (sciences - biology and physics, social sciences, geography, civics and foreign language). The teachers all have a bachelor's degree in their major teaching subject, some have a master's degree and some also have a Ph.D.

FINDINGS

The indicator was found to be valid and reliable and can be used to evaluate improvement in the quality of the tasks over time. This was performed by analyses that examined the distribution of each dependent variable using measures of descriptive statistics – mean, median, standard deviation and range. The correlations between the second and third order evaluation measures were examined by calculating Pearson coefficients.

Focusing on these measures was performed because of the large amount of evaluation scores, and because these measures, by being aggregate scores of lower order measures, express these measures.

Characterization of the Evaluation Tool – The Indicator

Each evaluation measure was measured at two points of time (time I: 2001-2004; time II: 2005-2007) by both investigators. Two scores were calculated. Each score was calculated as the mean of the two ratings. A higher value in each score indicates better ability. Inter-rater reliability was calculated for each score at each point of time using a Pearson correlation between the two ratings and its correction using the Spearman-Brown equation.

Table: 2
Inter-rater reliability values for the evaluation measures (53 tasks) in an order and time section

Measure evaluated	Until 2005	After 2005
Compulsory statements	0.98	0.99
Components of the learning task	0.96	0.99
Framework of the task	1	0.99
Prior knowledge	0.96	0.72
Goals	0.97	0.95
Description of the task	0.96	0.98
Work instructions for the learner	-----	-----
Definition of the learning products	-----	1
General didactics (pedagogical knowledge)	0.99	0.99
Adaptation to the target audience	-----	-----
Adaptation of sources	0.99	0.90
Affording a solution for the heterogeneity of the students	0.92	0.96
Readability and clarity of language	0.97	0.65
Inviting meaningful learning	1	0.93
Encouraging creativity/originality	1	0.91
Interactivity	1	1
Development of IT skills	0.90	0.98
Teaching method unique to the subject (pedagogical content knowledge)	0.99	0.98
Congruence with the curriculum	-----	0.91
Representation of the information and learning methods	1	0.95
Implementation of teaching in an online environment	0.96	0.98
Added value to the digital text	0.87	0.93
Diversity of means of illustration and expression	0.96	0.93
Design of the task in a digital format	0.84	0.89
Orientation and clarity of navigation	0.89	0.20
Organization of the information in digital format	0.99	0.97
Meeting the rules of ethics on the internet	0.96	0.96
Optional statements	1	1
Originality and representations	1	1
Adaptation of the product to the heterogeneity of the students	1	-----
Originality of the task	1	1
Absence of stereotypes	-----	-----
High-order cognitive skills and affording a solution for heterogeneity	1	0.99
Cognitive skills	1	0.98

Open learning situations	1	-----

Use of the online task	1	0.97
Instructions for the teacher	-----	-----
Adaptation to learning in additional contexts	0.99	0.96
Resources for performing the task	1	1
Access to individuals with disabilities	-----	-----
General evaluation	0.98	0.94
Final score for the task	0.99	0.99

Note: Reliability was not calculated when no variance was found in one or both ratings.

The reliability values for the two scores in each evaluation parameter are presented in table 2. It can be seen that for all scores, except orientation and clarity of navigation and level of readability and clarity of language at time II, the reliability level is standard (>0.70). A general score for each evaluation measure was not calculated as a mean of the two measurements beyond the measurement time, due to the low values of the reliability over time (stability). Reliability was calculated by the Pearson correlation between two administrations and the Spearman-Brown correction equation. However, it was found to be low and unacceptable for the scores of all measures (-0.95≤r≤0.66)

The data in table 2 indicate high inter-rater reliability in the evaluation measures: in the compulsory statements (0.98, 0.99), the optional statements (1,1), the general evaluation (0.98, 0.94) and the final score for the task (0.99, 0.99).

Evaluating the Quality of the Online Tasks

Table: 3 presents' measures (mean and median) and the distribution measures (standard deviation and range) for the distribution of the dependent research variables – the evaluation measures.

Table: 3
Measure for the evaluation measures in an order and time section (53 tasks)

Evaluation measure	Mean		Median		Standard deviation SD		Range (min-max)	
	Time I	Time II	Time I	Time II	Time I	Time II	Time I	Time II
Compulsory statements: summarizing score	71.43	74.18	71.37	75.73	7.14	6.97	(53-80.04)	(57.55-84.50)
Components of the learning task	2.20	2.18	2.17	2.20	0.18	0.20	(2-2.54)	(1.94-2.59)
Framework of the task	2.93	2.88	3.00	3.00	0.27	0.26	(2-3)	(2.17-3)
Prior knowledge	1.11	1.08	1.00	1.00	0.24	0.14	(1-1.75)	(1-1.42)
Goals	1.35	1.22	1.00	1.00	0.47	0.43	(1-2.25)	(1-2.50)
Description of the task	1.83	1.89	2.00	1.96	0.62	0.70	(1-2.75)	(1-3)
Work instructions for the learner	3.00	3.00	3.00	3.00	0	0	(3-3)	(3-3)
Definition of the learning products	3.00	2.99	3.00	3.00	0	0.04	(3-3)	(2.83-3)
General didactics (pedagogical knowledge)	2.04	2.16	2.08	2.18	0.21	0.19	(1.50-2.32)	(1.69-2.47)

Adaptation to the target audience	**3.00**	**2.99**	**3.00**	**3.00**	**0**	**0.03**	**(3-3)**	**(2.88-3)**
Adaptation of the sources	**2.70**	**2.82**	**3.00**	**3.00**	**0.61**	**0.41**	**(1-3)**	**(1.50-3)**
Solutions for the heterogeneity of the students	**1.14**	**1.42**	**1.00**	**1.33**	**0.24**	**0.40**	**(1-1.67)**	**(1-2)**
Readability and clarity of language	**2.68**	**2.95**	**3.00**	**3.00**	**0.46**	**0.08**	**(2-3)**	**(2.75-3)**
Inviting meaningful learning	**2.48**	**2.69**	**2.50**	**2.79**	**0.42**	**0.36**	**(2-3)**	**(2-3)**
Encouraging creativity/originality	**1.11**	**1.07**	**1.00**	**1.00**	**0.29**	**0.16**	**(1-2)**	**(1-1.50)**
Interactivity	**1.20**	**1.21**	**1.00**	**1.00**	**0.37**	**0.38**	**(1-2)**	**(1-2)**
Development of IT skills	**2.02**	**2.07**	**2.00**	**2.00**	**0.50**	**0.53**	**(1-2.75)**	**(1-3)**
Teaching method unique to the subject (pedagogical content knowledge)	**2.19**	**2.29**	**2.20**	**2.31**	**0.20**	**0.17**	**(1.70-2.40)**	**(1.85-2.58)**
Congruence with the curriculum	**3.00**	**2.95**	**3.00**	**3.00**	**0**	**0.11**	**(3-3)**	**(2.67-3)**
Representation of the knowledge and methods of learning	**2.55**	**2.68**	**2.58**	**2.75**	**0.46**	**0.32**	**(2-3)**	**(2-3)**
Implementation of teaching in an online environment	**2.18**	**2.29**	**2.17**	**2.34**	**0.38**	**0.37**	**(1.33-2.92)**	**(1.50-2.81)**
Added value to the digital text	**2.49**	**2.54**	**2.58**	**2.71**	**0.63**	**0.62**	**(1-3)**	**(1-3)**
Diversity of means of illustration and expression	**2.22**	**2.41**	**2.25**	**2.50**	**0.75**	**0.53**	**(1-3)**	**(1-3)**
Designing the task in a digital format	**2.48**	**2.53**	**2.58**	**2.79**	**0.56**	**0.55**	**(1-3)**	**(1.50-3)**
Orientation and clarity of navigation	**2.63**	**2.78**	**2.88**	**2.83**	**0.57**	**0.27**	**(1-3)**	**(2.25-3)**
Organization of the information in digital format	**1.40**	**1.80**	**1.13**	**1.75**	**0.58**	**0.83**	**(1-3)**	**(1-3)**
Meeting the rules of ethics on the internet	**1.83**	**1.64**	**1.83**	**1.58**	**0.76**	**0.58**	**(1-3)**	**(1-2.67)**

Optional statements: summarizing score	**71.93**	**73.53**	**74.63**	**74.95**	**6.08**	**5.19**	**(61.67-81.11)**	**(62.82-83.33)**
Originality and representations	**2.27**	**2.31**	**2.33**	**2.33**	**0.14**	**0.06**	**(2-2.50)**	**(2.11-2.33)**
Adaptation of the product to the heterogeneity of the students	**1.04**	**1.00**	**1.00**	**1.00**	**0.13**	**0**	**(1-1.50)**	**(1-1)**
Originality of the task	**2.79**	**2.95**	**3.00**	**3.00**	**0.38**	**0.18**	**(2-3)**	**(2.33-3)**
Absence of stereotypes	**3.00**	**3.00**	**3.00**	**3.00**	**0**	**0**	**(3-3)**	**(3-3)**
High-order cognitive skills and affording a solution for heterogeneity	**1.89**	**2.06**	**2.00**	**2.00**	**0.53**	**0.46**	**(1-2.50)**	**(1-3)**
Cognitive skills	**1.89**	**2.07**	**2.00**	**2.00**	**0.53**	**0.47**	**(1-2.50)**	**(1-3)**
Open learning situations	**1.14**	**1.02**	**1.00**	**1.00**	**0.36**	**0.05**	**(1-2)**	**(1-1.17)**
Use of the online task	**2.22**	**2.20**	**2.33**	**2.23**	**0.27**	**0.19**	**(1.33-2.33)**	**(1.67-2.33)**
Instructions for the teacher	**1.00**	**1.00**	**1.00**	**1.00**	**0**	**0**	**(1-1)**	**(1-1)**
Adaptation to learning in additional contexts	**2.74**	**2.65**	**3.00**	**2.71**	**0.58**	**0.44**	**(1-3)**	**(1.67-3)**
Resources for performing the task	**2.93**	**2.95**	**3.00**	**3.00**	**0.27**	**0.18**	**(2-3)**	**(2.33-3)**
General evaluation	**52.02**	**52.06**	**57.50**	**55.56**	**21.10**	**19.99**	**(1.67-71.67)**	**(14.17-85)**
Final score of the task	**69.64**	**71.83**	**70.74**	**73.80**	**7.31**	**6.89**	**(50.47-78.97)**	**(57.36-81.70)**

The data in Table: 3 indicate that the expected value in the distribution of many of the measures is around one from both ends of the evaluation scale (1 and 3). For example, the mean score for work instructions for the learner, defining the learning product, adaptation to the target audience, congruence with the curriculum, absence of stereotypes and originality of the task are located near or even on the upper limit of the measurement scale (3).

In contradistinction, the mean score for prior knowledge, encouraging creativity/originality, adaptation of the product to the heterogeneity of the students, open learning situations, and instructions for the teachers is located near or even on the lower end of the measurement scale (1).

Therefore, the standard deviation of these scores (the ones near 1) ranges from 0 to 0.36 at most, the range is limited and ranges from 0 to 1 at most. A significantly higher distribution was found in scores located around the center of the measurement scale, such as meeting the rules of ethics on the internet (standard deviation 0.76 at time I and range 1-3), organization of the information in digital format (standard deviation 0.83 and range 1-3) and general evaluation score (standard deviation 19.99 at time I and 21.10 at time II and range 1.67-71.67 and 14-17-85, respectively).

Analysis of the Correlations Between The Second and Third Order Evaluation Measures

The second order evaluation measures are components of the learning task, general didactics (pedagogical knowledge), teaching method unique to the subject (pedagogical content knowledge), implementation of teaching in an online environment, originality and representations, collaborative learning, high-order cognitive skills and affording a solution for heterogeneity and use of online tasks.
The third order evaluation measures are compulsory measure, optional measures and the evaluator's general evaluation.

The correlations between the second and third order evaluation measures were analyzed by calculating Pearson correlations. Table: 4 presents the correlations between the second order measures.

Table: 4
Correlations between second order evaluations measures at the two measurement times (53 tasks)

Evaluation measure	1	2	3	4	5	6	7
1. Components of the learning task	-----	0.45	0.55*	0.36	0.33	0.46*	0.56*
2. General didactics (pedagogical knowledge)	0.59*	-----	0.99***	0.77***	0.16	0.10	0.61**
3. Teaching method unique for the subject (pedagogical content knowledge)	0.58*	0.98**	-----	0.76***	0.16	0.11	0.62**
4. Implementation of teaching in an online environment	0.01	0.73**	0.78***	-----	0.20	-0.13	0.62**
5. Originality and representations	0.05	0.17	0.23	0.16	-----	0.09	0.80***
6. High-order cognitive skills and solution for heterogeneity	0.55*	0.25	0.22	-0.18	.26	-----	0.09
7. Use of the online task	0.24	0.75**	0.76***	0.68**	0.09	-0.09	-----

*** p<0.05, ** p<0.01, *** p<0.001 (one-way)**

Note: Correlations of time I are below the main diagonal and correlations of time II are above the diagonal. For example: The correlation between the components of the learning task and general didactics at time I is 0.59 and at time II it is 0.45.

Table: 4 presents some very high correlations between the measures of general didactics (pedagogical knowledge), teaching method unique to the subject, (pedagogical content knowledge) and implementation of teaching in an online environment: general didactics (pedagogical knowledge) and teaching method unique to the subject (pedagogical content knowledge) (r=0.98, p<0.001 at time I and r=0.99, p<0.001 at time II), teaching method unique to the subject (pedagogical content knowledge) and implementation of teaching in an online environment (0.78 and 0.76, respectively), general didactics (pedagogical knowledge) and implementation in an online environment (0.73 and 0.77, respectively).

This indicates a theoretical or operative overlapping between these measures. Very high correlations between variables can be due to two reasons: great overlapping in the theoretical definition of the two variables, or great overlapping in the measurement (operative definition) of the two variables.

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High correlations were also found in the measure of use of the online task and in other measures, especially at time I, for example with unique teaching method for the subject (pedagogical content knowledge) (r=0.76). The measures high-order cognitive skills and affording a solution for heterogeneity as well as originality and representations were not found to have significant correlations with the other measures, except for the relation between high-order cognitive skills and affording a solution for heterogeneity and with components of the learning task (0.55 at time I and 0.46 at time II), and the relation between originality and representations and use of the online task at time II (0.80).

Table: 5
Correlations between the third order evaluations measures at the two measurement times (53 tasks)

Evaluation measure	1	2	3
1. Compulsory	-----	0.42	0.92***
2. Optional	0.58*	-----	0.39
3. General evaluation	0.79***	0.50*	---

*** p<0.05, ** p<0.01, *** p<0.001 (one-way)**
Note: Correlations of time I are below the main diagonal and correlations of time II are above the diagonal.

It can be seen that the correlations between the third order evaluation measures (compulsory measures, optional measures and general evaluation) presented in table 5 are mainly significant positive relations. The relation between the compulsory measure and the general evaluation score is highest (r=0.79, p<0.001 at time I and r=0.92, p<0.001 at time II). Here too this relation indicates very high overlapping between the two measures.

DISCUSSION AND CONCLUSIONS

Use of an online environment for teaching is a major part of the processes supposed to be taking place in the education system. This is the natural environment in which youths live and function, and the education system should therefore use this technology in a correct and wise manner. As mentioned by Salomon (2000), technology itself will not lead to a change, but will help in the realization of a new pedagogy. In light of the awareness of the educational potential that exists in the integration of technology in education, Salomon presents a vision in which technology will be at the disposal of pedagogy and will help in its realization: Technology will enable accessibility to information and will supply interactive and collaborative instruments and the teacher will create learning situations that exploit the educational potential of technology, situations that require coping with high-level tasks and teamwork.

This article presented an indicator for evaluating online tasks that examines the pedagogical aspect which integrates technology and disciplinary contents (TPACK): technological pedagogical content knowledge (Mishra and Koehler 2006, 2009).The indicator was found to be valid and reliable and can be used to examine changes over time in TPACK among teachers.

The indicator for evaluating online tasks was adapted such that it would evaluate content knowledge, pedagogical knowledge, technological knowledge and technological pedagogical content knowledge -TPACK. These aspects were chosen after studying researches that demonstrate that online teaching will enable meaningful learning in which the learner is active and acquires high-order cognitive skills, such as making generalizations, asking questions, expressing a reasoned opinion, making comparisons or solving problems (Capper 2003; Herrington et al. 2005; Linn et al. 2004).

The combination between the pedagogical rationale and the technological tools enables exposure of the learners to rich and diverse information, enables dealing in complex contents that are relevant to the learners and enables experience in constructing rich and original products based on the newly acquired knowledge. This is learning that encourages cooperation while maintaining a meaningful educational dialogue with the teacher and with peers by means of the technological tools (Roschelle 2000; Lehtinen et al. 1998).

Uniqueness of the Indicator for Evaluating Improvement In Tasks Over Time

The tool was developed as an indicator with evaluation measures and performance criteria. The indicator contains three levels of evaluation measures.

The first order evaluation measures are the criteria. The second order evaluation measures are the components of the learning task, general didactics (pedagogical knowledge), teaching method unique to the subject (pedagogical content knowledge), implementation of teaching in an online environment (technological knowledge and TPACK), originality and representations, collaborative learning, learning at high-order cognitive skills and affording a solution for heterogeneity and use of the online task. The third order evaluation measures are compulsory measures, optional measures and the general evaluation of the evaluator (see appendix 1).

These three levels enable evaluating whether there is an effective combination of technology in pedagogy and contents in the online task and thus to evaluate the improvement in each of the following aspects and the integration between them: content knowledge, pedagogical knowledge, technological knowledge and technological pedagogical content knowledge.

An indicator for evaluating an online task should also comprise an instrument in the hands of the teachers to improve and advance the next tasks which they construct (Or Meir 2005).

When we examined other indicators that appear in the literature we saw that they do not afford sufficient resolution for our needs on knowledge in different fields (pedagogical knowledge), teaching method unique to the subject (pedagogical content knowledge) and implementation of teaching in an online environment (technological knowledge and technological, pedagogical content knowledge). The indicator which we used in the present research enables focusing on the various fields of knowledge and identification of the weak and strong points in these fields.

This indicator is not only an indicator for evaluating an online task. It can also be used by the teachers as a tool which enables them to test their professional development in aspects of content knowledge, technological knowledge, pedagogical knowledge, and in combination turns them into experts in writing online tasks: in the field of technological pedagogical content knowledge. This is a digital indicator that enables obtaining a measure of the quality of the task immediately and immediately identifies the strengths and weaknesses of each task. A scale of three levels of performance enables differentiation of results at low sensitivity.

We recommend examining expansion of the indicator to a scale of five levels of performance. For example, the existing three levels of performance in the indicator for the criterion "added value of the digital text and the online environment" are:

- **the digital text and the online environment have no added value for the task.**
- **A constraint of the online/computerized tools for the task is apparent, or only some of the tools have an added value to learning.**
- **The technological realization of digital tools and text has an added value to the learning process and to the advancement of learning.**

If we would convert the scale into a scale of five levels of performance, the choice between the criteria will be clearer and will afford a more accurate score. The following example illustrates the possibilities and sensitivities that a scale of five levels of performance affords to the criterion of "added value of the digital text and the online environment:"

- **the online task looks like a work sheet that can be printed.**
- **Use of computerized tools is apparent, but there is no use of online tools at all – for example there is use of hypertext in the task pages but no use of the web at all.**
- **A constraint of the online/computerized tools is apparent in the task – for example a forced use of the sources to which the task refers.**
- **Only some of the tools have an added value to learning.**
- **The technological realization of the digital tools and text has an added value in the learning process and in advancing learning.**

CONCLUSION

The digital indicator which was developed enables immediate evaluation of online tasks. The indicator can show improvement in the tasks over time in different fields: content knowledge, pedagogical knowledge, pedagogical content knowledge and TPACK. The indicator also enables teachers to construct better online tasks by identifying foci of difficulty prominently and immediately.

Thus, technology which is at the disposal of pedagogy helps in its realization since educated use of computerization in teaching may support meaningful teaching and learning and may comprise a lever for the teacher's coping with didactic, content and organizational issues (Linn et al. 2004).

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REFERENCES

Birenboim, M. (1997). *Alternatives in evaluating achievements*. Tel-Aviv University: Ramot (Hebrew).

Capper, J. (2003). Complexities and challenges of integrating technology into the curriculum. *TechKnowLogia*, 5(1), 60-63.

Cohen, L., Badichi, L., Levi, G. (2008). Computerized performance meter. Accessed on Dec. 17, 2008 (Hebrew): http://cms.education.gov.il/NR/rdonlyres/C0785650-3397-490B-943D-2008A8037C13A4EA/74799/task_indicator.xls

Condition of Education 2002 Indicator 18 (2002). National Center for Education Statistics. U.S. Department of Education. Office of Educational Research and Improvement. Accessed on July 12, 2001: http://nces.ed.gov/programs/coe/2002/pdf/18_2002.pdf

Dori, Y.J. (2003). From nationwide standardized testing to school-based alternative embedded assessment in Israel: Students' performance in the matriculation 2000 project. *Journal of Research in Science Teaching*, 40, 34-52.

Gao, S., Tong, Y., Rusu, L. (2006). Development of E-society in China. In Proceeding of the IAMOT Conference. Accessed Aug. 6, 2008: http://www.iamot.org/conference/index.php/ocs/10/paper/viewFile/1439/652

Goodrich, H. (1997). Understanding Rubrics. Originally published in Educational Leadership, 54(4). Accessed Aug. 6, 2008 http://www.middleweb.com/rubricsHG.html

Herrington, J., Reeves, T.C., Oliver, R. (2005). Online learning and information delivery: Digital myopia. *Journal of Interactive Learning Research*, 16 (4), 353- 367.

Hui, D., Guangzhi, W., Bo, H., Yiyi, Z., Zhi, Y., Meng, M., ShangKai, G. (2005). Construction of a Knowledge Center for Medical Image Processing. Accessed Aug. 6, 2008: http://ieeexplore.ieee.org/iel5/10755/33900/01616347.pdf

Inbal-Shamir, T., Kelly, I. (2008). Computerized teaching – a way of life or a burden for the teacher? Characterization of the range of computerized action of teachers. Article submitted at the Chase Conference, The Open University (Hebrew).

Lehtinen, E., Hakkaainen, K., Muukkonen, H. (1998). Computer Supported Collaborative Learning: A Review. University of Turku, University of Helsinki. Available at: http://etu.utu.fi/papers/clnet/clnetreport.html

Linn, M.C., Davis, E.A., Bell, P. (2004). *Internet environments for science education*. Mahwah, NJ: Lawrence Erlbaum Associates.

Mishra, P., Koehler, M.J. (2006). Technological Pedagogical Content Knowledge: A new framework for teacher knowledge. *Teachers College Record*. 108*(*6), 1017-1054.

Mishra, P., & Koehler, M.J. (2009). TPACK - Technological Pedagogical Content Knowledge. Retrieved November 11, 2009, from http://tpck.org

Nashi, T., Doron, A. (2008). Indicator for evaluation of quality in an online task. Draft 0.2, Ministry of Education, Tel-Aviv District, instruction team at the district. http:// www.atarnet.net/nodewebimages/24369/Files/mma3.docNoski Accessed on Sept. 2, 2008, Hebrew)

H., Shabtai, A., Rimor, R. (2006). To harness the horses of technology to the wagon of pedagogy: Implem*entation of a learning portal as a system for improving the quality of teaching and learning. Al Hagova*, 5, May 2006, pp. 34-37 (Hebrew).

Or Meir, Z. (2005). Computerized task: Definition characterization and components. Accessed Oct. 8, 2008 (Hebrew): http://www.orianit.edu-negev.gov.il/merkazh/sites/homepage/rakaz/mesimahgdara.htm

Parsad, B., Jones, J., Greene, B. (2005). Internet access in U.S. public schools and classrooms: 1994-2003. US Department of Education: ED Pubs.

Roschelle, J.M., Pea, R.D., Hoadley, C.M., Gordin, D.N., Means, B.M. (2000). Changing how and what children learn in school with computer-based technologies. *Children and Computer Technology*, 10(2). Available online at: http://www.futureofchildren.org/usr_doc/vol10no2Art4%2Epdf

Rotem, A. (2006). Megalithic model for characterizing and evaluating an online learning task. Accessed on Dec. 25, 2006 (Hebrew): http://avrumrotem.com/avrum-S/megalit

Rotem, A., Peled, I. (2008). *Towards an online school*. Tel-Aviv: Mofet Institute (Hebrew).

Salomon, C. (2000). Technology and education in the age of science. Haifa: Haifa University and Zmora Bitan (Hebrew).

Selant, A. (2007). On the nature of the online task today: Between Aya and Maya. Around the World Portal, Mofet Institute. Accessed on Aug. 2, 2008 (Hebrew): http://portal.macam.ac.il/DbImage.aspx?image=file&id=1497

Shepard, L.A. (2000). The role of assessment in a learning culture. Educational *Researcher,* 29, 4.

Shulman, L. S. (1986). Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher*, 15(2), 4-14.

Smith, K. (2004). Index as an instrument for evaluation in teachers' training. Article submitted in an online meeting, Mofet Institute. Accessed on Nov. 11, 2008 (Hebrew): http://ole.macam.ac.il/lecture/17-2-04/#link2

Wilson, L. (1994). What gets graded is what gets valued. *The mathematics teacher*, 87(6), 412-414.

Appendix No. 1:

Indicator for evaluating the quality of online tasks
Note: This is a digital indicator. This appendix presents only the text, without its digital advantages.
Indicator for evaluating an online task
Instructions for filling in the indicator:
Type a number between 0-3 in column H. 1-3 according to the appropriate column and 0 if the statement is not relevant.

Type the personal evaluation of the task in cell E113. The evaluation will be a number between 0.00-3.00.

	Characteristics of the online task	3 – high level of performance	2 – medium level of performance	1 – low level of performance	Ranking 1-3 or 0 – not relevant
Components of the learning task	Framework of the task	Are indicated: • Name of the school • Names of the writers of the task • Date of constructing the task • Subject of the task • Target audience • Schedule	Are indicated: • Subject of the task • Schedule • Target audience	There is no framework for the task, none of the required items appear	
	Prior knowledge	There is a detailing of the prior knowledge required for performing the task	The required prior knowledge is mentioned, with no detailing	Required prior knowledge is not mentioned	
	Goals	Learning goals in the field of content and skills of using an online environment are indicated	Goals are indicated partially	No goals are indicated	

	Description of the task	**There is an introduction in which:** • **There is a general description of the content** • **Its importance and relation to learning the subject is indicated** • **The way of work expected of the learner is indicated**	**There is a partial introduction**	**There is no introduction to the task**	
	Work instructions for the learner	**There are clear work instructions that are understood by the learner: general work instructions, and instructions for each activity that is found in the task at each of the stages of the task**	**There are partial work instructions for the learner and/or they are not clear to the learner**	**There are no work instructions for the learner**	
	Defining the learning product	**There is a definition of the learning product** **There are clear and detailed instructions for performing the product**	**There is a partial description of the learning product and/or not sufficiently detailed**	**There is no definition of the product**	
General didactics (pedagogical knowledge)	**Adaptation to the target audience**	**There is adaptation between the complexity of the task, the content, and the learning skills to the target audience**	**There is partial adaptation to the target audience**	**There is no adaptation to the target audience**	
	Adaptation of sources	**The sources to which the task refers are compatible with the target audience**	**The sources to which the task refers are partially compatible with the target audience**	**The sources to which the task refers are not compatible with the target audience or there is not referral to external sources**	

	Affording a solution for the heterogeneity of the students in the learning process	**There is reference to the heterogeneity of the students in the teaching-learning methods and in the scope of learning**	**There is partial reference to the heterogeneity of the students**	**There is no reference to the heterogeneity of the students**	
	Level of readability and clarity of the language	**The texts in the task (or those to which the learner is referred) are readable and clear**	**The texts in the task (or those to which the learner is referred) are reasonably but not sufficiently clear**	**The texts in the task (or those to which the learner is referred) are difficult and cumbersome**	
	Inviting meaningful learning	**The activity invites creation of new knowledge or summarizes knowledge in a manner that is meaningful for the learner**	**The activity partially invites creation of knowledge or summarizes for the learner**	**The activity does not invite creation of new knowledge or meaningful summary**	
	Promoting creativity / originality of the learner	**The activity invites creativity and original ways of expression**	**The activity partially invites creativity and originality**	**The activity does not invite creativity and originality**	
	Interactivity	**There is referral to interactive activity of the learners among themselves (such as an online discussion) There are instructions for an action which the student is required to perform for maintaining an interaction**	**There are partial instructions for an interactive activity**	**There is no interactive activity**	
	Development of IT skills	**The task contains reference to technological know-how skills (locating information, reading information, writing, representing knowledge, presenting knowledge and merging texts)**	**There is partial reference to technological know-how skills**	**There is no reference to technological know-how skills**	

Teaching methods unique to the subject (pedagogical content knowledge)	**Congruence with the curriculum in the field of knowledge**	**The contents of the task appear in the curriculum**	**Only some of the contents of the task appear in the curriculum**	**The contents of the task do not appear in the curriculum**	
	Representation of the information and ways of learning	**The ways of representing the information is suitable for the field of knowledge and the subject of the task**	**Some of the ways of representing the knowledge are suitable for the field of knowledge and the subject of the task**	**The ways of representing the knowledge are not suitable to the field of knowledge and the subject of the task**	
Implementation of teaching in an online environment	**Added value of the digital text and the online environment**	**The technological realization of the digital tools and text have an added value to the learning process and advancement of learning**	**A constraint of the online / computerized tools for the task is apparent, or only some of the tools have an added value to learning**	**There is no added value of the digital text and the online environment to the task**	
	Diverse means of illustration and expression	**The task contains diverse means of illustration such as: Pictures; organization / presentation of information in tables; illustrations by animations; simulations; movies / clips; audio information; maps**	**The task contains few digital means of illustration**	**The task makes no use of digital means of illustration**	
	Design of the task in digital format	**The design of the task is inviting, the pictures are relevant to the topic**	**The design of the task is inviting but the pictures are not relevant to the topic of the task**	**The design of the task is not inviting and the pictures are not relevant to the task**	
	Orientation and clarity of navigation	**It is easy to orient in the task (friendly navigation)**	**The navigator in the task is not friendly enough**	**There is no navigator in the task**	
	Organization of the information in digital format	**The organization of the information is compatible with the properties of the medium: links between parts of the task**	**There are few links in the task between the different parts of the information**	**There are no links between the different parts of the task**	

	Meeting the rules of ethics on the internet	**The task meets the rules of ethics on the internet: preservation of copyrights and maintenance of privacy**	**The task partially preserves copyrights and privacy**	**The task does not meet the rules of proper ethics**	
Originality and representations	**Adaptation of the product to the heterogeneity of the students**	**There is reference to the heterogeneity of the students in the product**	**There is partial reference to the heterogeneity of the students in the product**	**There is no reference to the heterogeneity of the learners**	
	Originality of the task	**The task contains a significant part that was written by the composer of the task**	**Most of the task is use of ready materials on the internet**	**The task has only a referral to a ready task on the internet**	
	Absence of stereotypes	**There are no stereotypes of any kind: race, religion, gender, nationality and worldview**	**The task contains hints at or it can be understood that there are stereotypes**	**The task clearly contains stereotypes**	
Collaborative learning	**Construction of common knowledge**	**There exists a collaborative learning activity in the task There exists clear and explicit construction of the learners' role**	**There is a collaborative learning activity in the task, but there is no clear and explicit construction of the learners' role in the collaborative activity**	**There is no reference to collaborative learning activity in the task**	
	Realization of collaborative tools	**Collaboration is realized in the appropriate online tools such as WIKI, blogs, social network, etc.**	**The collaborative activity is realized by partially online tools or is inappropriate**	**The collaborative activity is not realized by targeted collaborative online tools**	
	Collaborative learning product	**A clear collaborative learning product is defined where every students has a possibility and obligation of expression**	**A collaborative product is declared vaguely and not every student has the possibility and obligation of expression**	**A collaborative product is not defined**	

	Open communication between the learners	**The communication is open, transparent, and creates an atmosphere of openness and intimacy which encourages participation**	**The activity is carried out with open communication between the learners, but there is no invitation to openness and intimacy without fear of judgment and criticism in the task**	**There is no open communication between the learners, there is no encouragement, neither in the instruction nor in the illustration for open communication**	
	Self and collaborative evaluation of the learning – reflection	**The activity invites reflection by the learner about his work and the work of his peers in the group**	**The activity invites personal reflection or reflection of peers**	**The activity does not invite reflection by the learner**	
	Instructor / teacher is present and active during the collaborative learning	**An instructor / teacher is present during the collaborative online learning – responds during the learning**	**There is partial / little presence of an instructor / teacher during the collaborative learning**	**There is no presence of an instructor / teacher during the activity**	
High-order cognitive skills and solution for heterogeneity	**Cognitive skills**	**The learning that is proposed in the task invites the development of Cognitive skills**	**The learning in the task partially invites the development of Cognitive skills**	**The learning in the task does not invite the development of learning skills**	
	Open learning situations	**The task invites open learning situations**	**The task does not make wise / proper use of open learning situations**	**There are no open learning situations in the task**	
Use of the online task	**Instruction for the teacher**	**There exists a clear instructions sheet for the teacher**	**There are partial and/or unclear instructions for the teacher**	**There are no instructions for the teacher**	
	Adaptation to learning in additional contexts	**The task can be adapted to different target audiences and/or different learning topics**	**The task can be partially adapted to different target audiences and/or different learning topics**	**The task cannot be adapted to different target audiences or to different learning topics**	

	Resources for performing the task	**The resources required for performing the task are standard, accessible and available**	**Some of the resources required for performing the task are standard and available**	**The resources required for performing the task are not standard and are not available**	
	Accessibility for people with disabilities	**The task meets the standard of accessibility for people with disabilities**	**The task partially meets the standard of accessibility for people with disabilities**	**There is no reference to the standard of accessibility for people with disabilities**	

Table for concentrating the results

Compulsory statements	**Components of the learning task**	
	General didactics (pedagogical knowledge	
	Pedagogical content knowledge	
	Implementation of teaching in an online environment	
Optional statements	**Originality and representations**	
	Collaborative learning	
	High-order cognitive skills and solution for the heterogeneity of the students	
	Use of the online task	

		Net score (out of 100)
Compulsory statements	**0.00**	**0.00**
Optional statements	**0.00**	**0.00**
General evaluation		

The score of the evaluation should be filled in on a scale of 0.00-3.00