5th New Researchers' Conference (NRC) on Didactics in Science and New Technologies in Education

Guidelines for the Synopsis

The length of the Synopsis should be at least 1000 and at most 1500 words, including an abstract of about 90-100 words in Greek and the corresponding translation in English (Greek abstract is optional for international participants). The Synopsis should not exceed 4 A4 pages (including figures, tables, illustrations, photographs, etc.).

1. Page size and margins

A4 page size: 210 x 297 mm with international standard margins of 1 inch (2.54 cm) on all sides.

2. **Title of article**

Font: Calibri bold, 16 pt. Font: 21 pt, centred.
The main words with Capital initials.

Leave 2 lines between the title of the paper and the abstract.

3. Abstract and keywords (abstract & keywords)

Font: Georgia, 10 pt. Font: 12 pt, full-text alignment, no paragraphs, no indented paragraphs, no bibliographic references.

The titles "Abstract" in Calibri bold, 12 pt. font, 16 pt. font, centred alignment. The titles "Key words": in Calibri bold italic, 12 pt. font, 16 pt. font left **justified** and indented.

The abstract (90 to 100 words) and the **keywords** [up to five (5) words/terminology] must be in two languages, first in Greek, in alphabetical order, and then in English, separated by commas. All are in lowercase (except for possible main names). No period at the end.

There is no blank space between the title "Abstract" and the corresponding text. The keywords are in continuation of the corresponding titles.

Leave 2 lines between the English summary and the main text.

4. Main text

The main text should include the following sections (with numbered headings):
1. Introduction 2. Methodology 3. Results 4. Conclusions 5. References

4.1. Body of text

Font: Georgia, 11 pt. Font: 13 pt, full alignment, no indentation in the first paragraph of each section. 0,5 cm indentation in the remaining paragraphs.
Punctuation between paragraphs: 3 pt before and after.

4.2. Module titles (1-5)

Font: Calibri bold, 12 pt. Font: 16 pt, left justified. Post space: 6 pt. Main words with initial capitalization. The text starts in a new paragraph without indentation.

4.3. If there is a subtitle (unnumbered)

Font: Calibri bold Italic, 11 pt. Font: 16 pt, left justified.

Post space: 6 pt. The main words with initial capital. The text begins in a new paragraph without indentation.

In titles, subtitles and captions of tables/articles, we do not put full stops at the end of sentences.

Footnotes should be avoided, as should endnotes. If they must be inserted, use Font: Georgia, 9 pt. Font: 12 pt, full alignment, no indented paragraph.

5. Alignment

Full alignment. Do not manually split words or use hyphenation. Do not truncate continuity in long DOIs or URLs**.**

6. Paragraph indentation

No indentation in the 1η order of each paragraph in the summary, in the titles and subtitles and in the 1η order of the paragraphs of the sections. In the remaining paragraphs, indent 0,5 cm.

In the quotation, the whole paragraph is indented 0.5 cm (as here).

If the quotation has two or more paragraphs, then the beginning of the second and subsequent paragraphs have an additional 0.5 cm indentation, i.e. a total of 1 cm (as here).

Instead, in the Bibliography the "negative" indentation (hanging indent) is set to 0.5 cm (as here) (paragraph -> indentation -> special -> hanging, setting 0.5 cm).

7. Dots or numbering

- Full alignment with 0.5 cm indentation on all lines and 0.5 cm spacing of the text.
- The space between paragraphs remains.

8. Tables, graphs, figures and their titles

Maximum width of table, graph, etc. as wide as the width of the text.

Tables, pictures, etc. are numbered: Table 1, Table 2, etc., Figure 1 or Figure 1, Figure 2 or Figure 2, etc. In the case of Tables, the title is above the Table and the caption continues in the

same order; in the case of figures and figures, the title is below the figure/shape and the caption continues in the same order.

Title font: Georgia 10 pt. Bold the word "Table", "Figure", "Image", but not the title's acronym. Font: 12 pt, centred alignment.

Text font in the cells of the Table: Georgia 9 pt. Font: 11 pt, left alignment in cells with words, centred in cells with numbers or one-word words (YES/NO).

Tables may have headings describing the columns or rows.

Numbered explanatory notes (e.g. sources) are placed under tables, figures, etc. The word "Note" is in italics. The same applies to Figures or Illustrations.

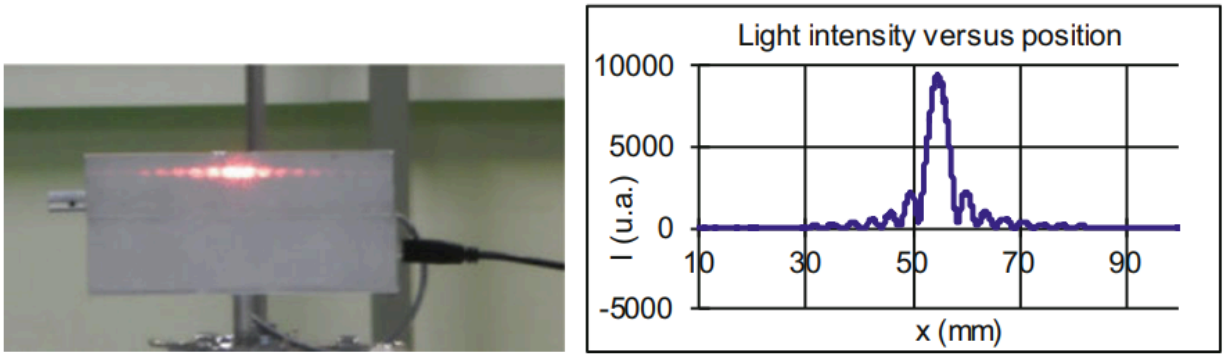
The title of a figure, the note under the figure and the figure's footnote are three different things!

Examples of a table, picture with diagram and figure:

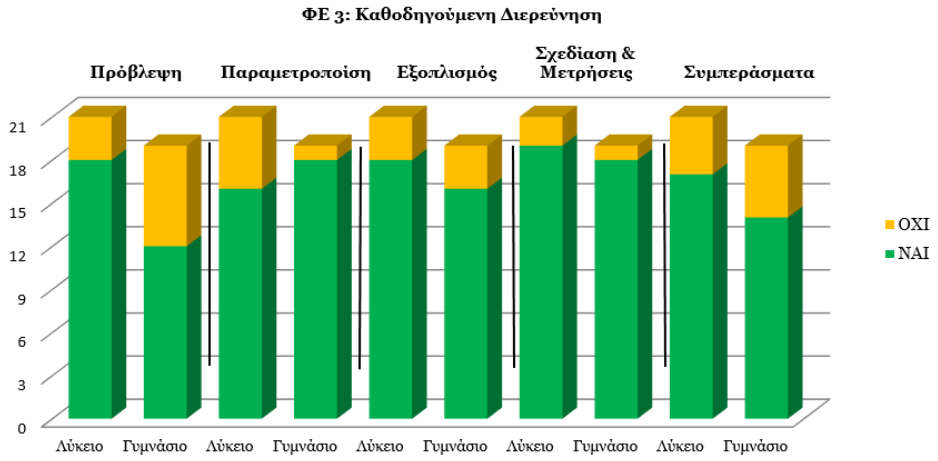
Πίνακας 2: Η αλληλουχία των ΦΕ

Στάδια της Διερεύνησης	ΦΕ 1	ΦΕ 2	ΦΕ 3	ΦΕ 4
Ποιος θέτει το πρόβλημα;	Κ	Κ	Κ	Κ
Ποιός διατυπώνει το ερώτημα της έρευνας;	Κ	Κ	Κ	**Μ**
Ποιος επιλέγει τις παραμέτρους;	Κ	Κ	**Μ**	Μ
Ποιος επιλέγει τον εξοπλισμό;	Κ	Κ	**Μ**	Μ
Ποιος επιλέγει την πειραματική διαδικασία;	Κ	**Μ**	Μ	Μ
Ποιος κάνει προβλέψεις;	Μ	Μ	Μ	Μ
Ποιος εκτελεί το πείραμα;	Μ	Μ	Μ	Μ
Ποιος παίρνει τις μετρήσεις;	Μ	Μ	Μ	Μ
Ποιος διαχειρίζεται τα αποτελέσματα;	Μ	Μ	Μ	Μ
Ποιος συνάγει τα συμπεράσματα;	Μ	Μ	Μ	Μ
Ποιος συγκρίνει προβλέψεις με συμπεράσματα;	Μ	Μ	Μ	Μ

Σημείωση: «Κ» καθηγητής στο ΦΕ – «Μ» μαθητής



Σχήμα 4. The Lucegrafo system and light intensity pattern and data of a single slit of 0.12 mm width



Σχήμα 3: Ιστόγραμμα εμπλοκής μαθητών στο 3ο ΦΕ

9. References

Bibliographical references, both in the text and in the "References" section, should follow APA style (7th ed.). Everywhere doi or (especially for books) ISBN. If there is no website and date of access.

In the Bibliography, use the same typeface as the text (Font: Georgia, 10 pt. Font: 13 pt, full alignment), but "negative" indentation (hanging indent), also at 0.5 cm.

Example:

Georgakakakos, P., Skalomenos, A., Sfarnas, N., & Christakopoulos, I. (2000). *3rd grade physics of general education in the third grade of the Secondary School*. Edition B, OEDB.

Ceceri M., Salta K., & Stavrou D. (2017). Investigating the integration of nanoscale changes in the properties of material bodies at the high school level. In. Stavros.Stavros, Michalis.Michalis, Michalis.Kokolaki A. (Eds.), *Proceedings of the 10th Panhellenic Conference on Science Teaching and New Technologies in Education - Bridging the Gap between Science, Society and Educational Practice,* pp. Stavros.Stavros.Michalis.Michalis.Koliakis, A. (Eds.), *Proceedings of the 10th Panhellenic Conference on Science Teaching and New Technologies in Education - Bridging the Gap between Science, Society and Educational Practice,* pp. 811 - 820. Laboratory of Science Teaching, PTSD, University of Crete.

Komorek, M., Duit, R., Buecker, N., & Naujack, B. (2001). Learning process studies in the field of fractals. In H. Behrendt, H. Dahncke, R. Duit, W. Gräber, M. Komorek, A. Kross, & P. Reiska (Eds.), *Research in science education - Past, present and future* (pp. 95-100). Dordrecht: Kluwer.
https://link.springer.com/chapter/10.1007/0-306-47639-8_11

Prigogine, I., & Stengers, I. (1984). *order out of chaos.* bantam. ISBN: 978-0553340822.

Below is an annotated sample for the authors.

The Restructuring Model of Teaching: Bridging the Gap between Science and Science Teaching

Summary

The Teaching Restructuring Model is a theoretical framework for research and development in science teaching. In other words, it attempts to unify two dominant trends in Science Teaching that can be characterized as *science orientation* and *student orientation*. This paper presents examples of research conducted by the author or under his supervision that use the Restructuring Teaching Model as a theoretical framework. In particular, there will be a focus on: a) the transformation of scientific content into content to be taught and b) the design of instruction by teachers.

Abstract

The Model of Educational Reconstruction (MER) is a theoretical framework for research and development in science education. Its main aim is to bridge the gap between science content concerns and pedagogical concerns. In the present paper examples of research based on MER carried out by the author or under his supervision are presented. The focus will be: a) on the transformation of the science content into a content of instruction and b) on the educational structuring by teachers.

Keywords: didactic learning sequence (series), didactic transformation, didactic restructuring model

Key words: teaching learning sequence, didactic transposition, model of educational reconstruction

1. Introduction

The Model of Educational Reconstruction (MER) has been developed by German researchers as a theoretical framework for research aimed at investigating the possibility of teaching basic concepts, ideas and principles of science (Duit et al., 2012). Its main goal is to balance scientific content and conceptions of teaching and learning when developing Teaching - Learning Sequences (TLS) (Meheut & Psillos, 2004). It tries to unify two dominant trends in Science Teaching and Learning (ST) which can be characterized as *science orientation* and *learner orientation* (Duit, 2007).

It seems that a successful design of instructional learning series should integrate these two trends (Dahncke et al., 2001; Duit, 2007). This position is reflected in a view of the field of DSE as an autonomous interdisciplinary field, which has as reference, in addition to Natural Science (SSE), disciplines such as History and Philosophy of SSE, Pedagogy, Psychology, Linguistics, etc.

The Model for Educational Restructuring (MER)

In the Model of Educational Restructuring (MER), the analysis of the structure of scientific content and empirical investigations of the perceptions and learning processes of students and teachers are considered equally important activities for the creation of appropriate learning environments. Scientifically, the model is based on a constructivist view of teaching and learning, as described for example by Duit & Treagust

(2003) and consists of three
interdependent components:

α) *Clarification and analysis of the Scientific Content*. It refers to the didactic analysis of scientific content and analysis of its educational value.

b) *Research in Teaching and Learning*. It includes the investigation of students' views and learning processes towards the scientific point of view, but also investigation of teachers' views in relation to the scientific subject,
students' learning
ideas and processes
, their role in the learning process, etc.

c) *Design and Evaluation of Learning Environments*. It concerns the design and evaluation of teaching materials, learning activities, learning
series, etc.

Below is a table (Table 1) that is not related to the text of the model, but is an example of how a table should be included in the work to be submitted.

Table 1. Teachers' attitudes towards the use of ICT

Posts Teacher positions	**I completely disagree**	**I disagree**	**Neutral**	**I agree**	**I fully agree**
The Dropbox service has been instrumental in my own education.				**2**	**3**
The use of a learning management system (e.g. edmodo, e-class, moodle, etc.) improved the module.			**3**	**1**	**1**
I would prefer it if all meetings could be held in person.	**1**	**2**		**1**	**1**

Note: For teachers' responses, the three-point scale was used.

2. Methodology

MER has been the theoretical framework for a series of research related to the teaching and learning of PE (see Duit et al., 2012). As an example of an application of MER here, we will refer to a research on the didactic reconstruction of the interaction of regularity and randomness in nonlinear dynamical systems (Stavrou & Duit, 2014). In this research, the process of didactic reconstruction was carried out as follows

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3. Results

A central assumption of the model is that scientific content must be appropriately processed in order to be taught at school level[1] .

[1] If a footnote is to be inserted, put Font: Georgia, 9 pt. Font: 12 pt, full alignment, no paragraph indentation.

That is, scientific content, as for example found in university science books or in scientific journals etc., should be transformed into content to be taught.

4. Conclusions

By analogy with MER, the Educational Reconstruction of Teacher Education (ERTE) model has been developed (Duit et al, 2012; Komorek & Kattmann, 2008). ERTE retains the basic principles of MER and its triangular form and aims to formulate guidelines for teacher education by taking into account Pedagogical Content Knowledge (PCK) (Kind, 2009) and conceptions of structuring teaching (Figure 6). The MER's key dimensions for structuring instruction are also incorporated into ERTE component 1, as shown in Figure 1 (van Dijk & Kattmann, 2007).

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