



Dimitrios Sklavakis

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Gender: Male **Date of birth**: 28/08/1970 **Nationality**: Greek

WORK EXPERIENCE

[01/09/2014 – Current]

Teacher of Mathematics and ICT

European School Brussels III

City: Brussels | **Country**: Belgium

- Coordinator for the Steering Committee Implementation for the new Mathematics Syllabus at the European School Brussels III, in cooperation with the Head of the Pedagogical Development Unit of the OSG and the school management.
- School Mathematics Coordinator:
 - a. Monthly meetings for harmonization of teaching methodology and use of digital educational tools
 - b. Project coordinator for the use of Tablet PCs, OneNote and the cloud (OneDrive): "Use of digital educational tools in mathematics for a paperless classroom"
 - c. EuroScola Intelligent Math Content Project: Development of a Taxonomy using Sharepoint's controlled Metadata, describing the competences of the whole mathematics curriculum from S4 to S7. The Taxonomy was used for the annotation of math documents to provide Knowledge sharing, content discoverability and support Harmonisation between math teachers of the school.
- Mathematics Coordinator for the Greek Language Section:
 - a. Online TEAMS seminars for the colleagues of my language section to train them in using the new digital educational tools.
 - b. Organized for 4 school years (2015-2019) the participation of the Greek Language section students in the Math Competitions "Euclid", "Thalis" and "Archimedes" in cooperation with all stakeholders, the Hellenic Mathematical Society, the school's Management and the fellow math teachers.
- Experimental teaching of algebraic operations (expanding and factoring) using the online STEM platform Möbius and an Intelligent Tutoring System based on Maple.
- Mentor for new CDC and Detached teachers of mathematics.



- Trained as a multiplier for the “Learn to learn” project at the European School Brussels III.
- Preparation of students for the PISA 2022 test.
- Extensive experience in online teaching.
- Use of: TI NSPIRE CAS, GeoGebra, Cabri Geometre 3D, Interactive whiteboards, MS Office 365 (OneNote, OneDrive, Sharepoint, Forms, Teams), OneNote Math tools and Math Assistant.
- Teacher of Mathematics and ICT of all levels (Greek and English section)

[02/10/2011 – 30/08/2014] **Deputy Director**

Musical School

City: Drama | **Country:** Greece

- Supporting the Director in partnerships with other institutions
- Supporting the Director in change management projects
- Communication and coordination between the Direction and the teaching staff
- Communication activities with other schools
- Preparing project proposals and applications
- Monitoring project progress
- Organising and participating in various project-related meetings and events
- Organising various workshops, seminars and conferences.
- Facilitating the exchange of best practices and innovative pedagogical approaches.
- Coordinating the installation of interactive whiteboards.

[01/09/2003 – 30/08/2014] **Teacher of Mathematics**

Ministry of Education, Directorate of Secondary Education

City: Drama | **Country:** Greece

- Teaching courses of mathematics and ICT of all levels
- Use of Tablet PC + OneNote + OneDrive for a paperless classroom
- Experimental teaching of algebraic operations (expanding and factoring) using the MATHESIS Intelligent Algebra Tutor developed by me during my doctoral studies.
- Development of an MS ACCESS Database for the Human resources Office, Directorate of Secondary Education.

[04/11/2001 – 30/06/2003] **Associate Teacher of ICT**



Ministry of Education, Directorate of Secondary Education

City: Drama | **Country:** Greece

[31/03/1996 – 30/08/2000]

Educational Private Sector

Private Enterprises

City: Drama | **Country:** Greece

- Teacher of Mathematics and ICT
- Analysis and Design of Computer Software

EDUCATION AND TRAINING

[27/06/2007 – 20/12/2015]

Doctor of Philosophy (Ph. D.) - "Excellent"

Department of Applied Informatics, University of Macedonia

City: Thessaloniki | **Country:** Greece | | **Final grade:** Excellent | **Level in EQF:** EQF level 8 | **Thesis:** The MATHESIS Meta-Authoring Framework for Intelligent Tutoring Systems in Mathematics

Development of Authoring Tools for Intelligent Tutoring Systems in Mathematics using Artificial Intelligence and Semantic Web Technologies (Ontologies)

[30/09/1997 – 29/09/1998]

Master of Science (MSc) in Artificial Intelligence - "Excellent"

Department of Artificial Intelligence, University of Edinburgh

City: Edinburgh | **Country:** United Kingdom | | **Final grade:** Distinction | **Level in EQF:** EQF level 7 | **Thesis:** "Implementing Problem-Solving Methods in CYC"

Themes: Expert Systems, Knowledge Representation and Inferencing, Automated Reasoning, AI Languages- PROLOG, LISP, CLIPS

Thesis: Development of an Expert System for diagnosing malfunctions in Personal Computers using the Systematic Diagnosis problem solving method.

[13/10/1988 – 10/03/1993]

Bachelor of Science (BSc) in Mathematics

Aristotle University

City: Thessaloniki | **Country:** Greece |

LANGUAGE SKILLS

Mother tongue(s): Greek

Other language(s):

English

LISTENING C2 READING C2 WRITING C2

SPOKEN PRODUCTION C2 SPOKEN INTERACTION C2

French

LISTENING C2 READING C2 WRITING C2

SPOKEN PRODUCTION C2 SPOKEN INTERACTION C2



Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

SKILLS

Microsoft Word | Microsoft Excel | Outlook | Microsoft Powerpoint | Microsoft Office | Microsoft Access | Microsoft Office 365 | Sharepoint | OneNote | Microsoft Teams | LinkedIn | Skype for Business | Geogebra | Maple | Mobius | Visual Basic | C | C++ | JAVA | JavaScript | PROLOG | LISP | CLIPS | CYC | LATEX | HTML | MathML | PHP | MySQL | Python | Microsoft Immersive Reader | Android Math Apps | Protege Owl | Lego education Mindstorms | Scratch (Advanced) | UnityEngine.UI | Augmented Reality (Ongoing)

CONFERENCES AND SEMINARS

[13/09/2024 – 14/09/2024]

The Learning Innovations Summit 2024, 'Unveiling the Future of Learning & Artificial Intelligence'

University of Nicosia, Cyprus

The Learning Innovations Summit (formerly known as Innovative Learning Environments) is an annual global event aimed at bringing to the forefront the transformative journey of education by fostering an inclusive and dynamic platform where technology and learning converge.

This year, we will be delving into the potential of AI and XR technologies in education and teaching with LIS2024 - 'Unveiling the Future of Learning & Artificial Intelligence'.

Link: <https://learningsummit.eu/>

[01/10/2022 – 30/04/2023]

European Committee for Standardization: eXtended Reality for Learning and Performance Augmentation

Online meetings

Member of the Workshop Group that developed a recommendation for a holistic register of standards that can serve to establish interoperability in support of XR learning and performance augmentation.

Link: https://www.cencenelec.eu/news-and-events/news/2022/workshop/2022-05-30_xr/

[10/02/2023 – 15/02/2023]

ARETE Hackathon "EdXR challenge: Design, Create, Code, Analyse" Online

Leader of a pan-European team of teachers that designed and developed an Education eXtended Reality (XR) application using the ARETE Augmented Reality Authoring Tools.

Link: <https://www.areteproject.eu/newsevents/body,673026,en.html>

[03/04/2023 – 30/09/2024]

Erasmus+ Vol3DEdu: VOLUMETRIC 3D TEACHERS IN EDUCATIONAL REALITY

Online and Onsite



Master teacher of a pan-European team of teachers. The project aims to develop digital skills for all, while at the same time providing open source XR digital content and lesson plans to share good practices.

Link: <https://vol3dedu.eu/>

[14/10/2019 – 16/10/2019] **MAPLE CONFERENCE 2019** WATERLOO, CANADA

Presented my paper **Transforming Maple into an Intelligent Model-Tracing Math Tutor**.

Demonstrated the **Maple Intelligent Model-Tracing Math Tutor**.

Link: https://youtu.be/gRc5ZvEg8_E

[31/10/2019 – 01/11/2019] **DigitalEd Connect Europe 2019** TU Delft - The Netherlands

I attended to investigate the embedding of my Maple Intelligent Model-Tracing Math Tutor in Möbius.

[22/09/2016 – 22/09/2016] **MAPLESOFT ROADSHOW 2016** Ghent

Attended the course “Maplesoft Roadshow 2016” held at the University of Ghent for the use of **Maple’s Online Testing and Assessment** system for Mathematics.

[08/06/2016 – 08/06/2016] **WOLFRAM EUROPEAN TECHNOLOGY TOUR** Eindhoven

Attended the “Wolfram European Technology Tour” held at the Technical University of Eindhoven about computational and knowledge-based programming

[23/07/2006 – 03/08/2006] **COGNITIVE TUTORS SUMMER SCHOOL** PITTSBURGH

Study of the theory, development and authoring tools for Carnegie Mellon's Cognitive Tutors

[25/08/2002 – 28/08/2002] **NEW TECHNOLOGIES IN EDUCATION** Sweden

Interstate educational project organized by the Interbalkan Institute of Public Administration.

[09/12/2003 – 09/12/2003] **GEOMETER'S SKETCHPAD** Greece

Presentation of the dynamic geometry software “Geometer’s Sketchpad” for teachers of mathematics, organized in cooperation with the Department of The Hellenic Mathematical Society and the regional Inspector of Mathematics in Greece.

[30/09/2012 – 21/10/2012] **ONLINE COURSE COORDINATOR** Greece



Coordinator of online course on the telelearning platform of the Directorate of Secondary Education, organized by the Department of Electrical and Computer Engineering, Section of Software and Application Development.

[29/05/2005 – 02/06/2005] **GEOMETER'S SKETCHPAD TRAINING** Greece

Maths and Physics teachers' training in the use of the dynamic geometry software "Geometer's Sketchpad"

[02/12/2009 – 03/12/2009] **MATHESIS Intelligent Algebra Tutor** Greece

Presentation and training in the use of my Intelligent Algebra Tutor MATHESIS

[22/04/2010 – 24/04/2010] **LAB TRAINING in MATHESIS**

Lab training in the use of my Intelligent Algebra School MATHESIS at the Panhellenic Educational Conference in various cities.

OTHER SKILLS

Personal

Dedicated, cooperative, innovative, strong team spirit and ability to work in team, strong sense of duty and responsibility, taking initiatives and able to work under minimal supervision in stressful conditions, flexibility and adaptation to changes or new environments, well-organised with very good planning skills.

Sociable and open-minded character with experience in multicultural and multilingual environments.

PUBLICATIONS

[2024] **The GeoGebra Intelligent m-Tutors**

Reference: To be published

One-to-one tutoring has proven to be one of the most effective ways of teaching. The implementation of this tutoring model poses the problem of developing Intelligent Tutoring Systems that provide the same tutoring quality with a human tutor. The most successful paradigm is that of Model-Tracing Tutors which have shown significant success in mathematics. This chapter describes a suite of web-based, intelligent model-tracing tutors for 2-dimensional vector calculus, developed using GeoGebra and JavaScript. They cover the following competencies: calculation of vector coordinates graphically and from its initial and terminal points; calculation of vector magnitude from its coordinates; calculation of the distance of two points from their coordinates; calculation of a segment's midpoint from the coordinates of its endpoints; investigation of whether two vectors are parallel or not; calculation of a line's equation from two points. Each tutor guides the student in a step-by-step manner, providing



feedback and support in every step, the cornerstone feature of model-tracing tutoring that makes it so powerful and effective. The tutors are modular, implementing the above atomic and composite competences in various levels of domain cognitive task analysis (micro-, midi- and macro-levels). Implemented as web pages, they call each other to achieve this modularity and therefore scalability. It is the uniqueness and novelty in the implementation and combination of all these advanced features - model-tracing, modular, micro-, midi- and macro-tutoring - that justifies the use of the m- prefix of the GeoGebra intelligent m-Tutors.

Authors: D.Sklavakis | **Journal Name:** LIS2024 Proceedings | **Volume, Issue and Pages:** Book: "Revolutionising Learning: The Convergence of AI, XR and Emerging Technologies." | **Publisher:** SPRINGER Nature

[2020] [Sklavakis D. \(2020\) Transforming Maple into an Intelligent Model-Tracing Math Tutor. In: Gerhard J., Kotsireas I. \(eds\) Maple in Mathematics Education and Research. MC 2019. Communications in Computer and Information Science, vol 1125. Springer, Cham](#)

Link: https://youtu.be/gRc5ZvEg8_E

[2015] [D. Sklavakis. The MATHESIS Meta-Authoring Framework for Intelligent Tutoring Systems in Mathematics. PhD Thesis, Department of Applied Informatics, University of Macedonia, Greece, 2015.](#)

[2014] [D. Sklavakis and I. Refanidis. The MATHESIS meta-knowledge engineering framework: Ontology-driven development of intelligent tutoring systems. Applied Ontology, Vol. 9 \(3-4\), pp. 237-265, 2014](#)

[2013] [D. Sklavakis and I. Refanidis. MATHESIS: An Intelligent Web-Based Algebra Tutoring School. International Journal of Artificial Intelligence in Education Vol. 22, pp. 191-218, 2013.](#)

[2011] [D. Sklavakis and I. Refanidis. The MATHESIS Semantic Authoring Framework: Ontology-Driven Knowledge Engineering for ITS Authoring. Proceedings of the 15th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems , Kaiserslautern, Germany, September 2011. Springer, KES 2011, Part II, LNAI 6882, pp 114-123, 2011](#)

[2010] [D. Sklavakis and I. Refanidis. Ontology-Based Authoring of Intelligent Model-Tracing Math Tutors. Proceedings of the 14th International Conference on Artificial Intelligence: Methodology, Systems, Applications \(AIMSA 2010\), Varna, Bulgaria, 8-10 September, 2010. Springer, LNAI 6304, pp 201-210, 2010.](#)

[D. Sklavakis and I. Refanidis. MATHESIS: A Web-Based Intelligent Tutoring School for Algebra. Intelligent System Demonstration at the 6th Hellenic Conference on Artificial Intelligence \(SETN 2010\), Athens, 4-7 May, 2010](#)



- [2009] [D. Sklavakis and I. Refanidis. The MATHESIS Ontology: Reusable Authoring Knowledge for Reusable Intelligent Tutors. 7th International Workshop on Ontologies and Semantic Web for E-Learning \(SWEL09\) in conjunction with AIED 2009, Brighton, 7th July, 2009](#)
- [2009] [D. Sklavakis and I. Refanidis. The MATHESIS Algebra Tutor: Web-based Expert Tutoring via Deep Model Tracing. Interactive Event at the 14th International Conference on Artificial Intelligence in Education \(AIED2009\), Brighton, 6-10th July, 2009](#)
- [2008] [D. Sklavakis and I. Refanidis. An Individualized Web-based Algebra Tutor Based on Dynamic Deep Model Tracing. 5th Hellenic Conference on Artificial Intelligence, Syros, Greece. Springer](#)
- [1999] [Aitken, J.S., and Sklavakis, D. Integrating Problem-Solving Methods into Cyc. Proceedings of the 16th International Joint Conference on Artificial Intelligence , ed. Dean, T., Stockholm, 3-6th August 1999, Morgan Kaufmann.](#)
- [1998] [D. Sklavakis. Implementing Problem-Solving Methods in CYC. MSc Thesis, Department of Artificial Intelligence, University of Edinburgh, 1998.](#)

CREATIVE WORKS

[2024 – Current] **MATHESIS - Intelligent GeoGebra Tutoring School**

Its core is the GeoGebra Intelligent m-Tutors, a set of web-based AI programs that allow students to solve exercises using GeoGebra in a step-by-step manner. The AI software acts as a human tutor that provides individualised and differentiated, self-paced step-by-step tutoring. It traces the problem-solving steps of the student, giving instant feedback about correct/false steps and guides along the correct solution path(s). At the same time, it builds a detailed student model by recording in a database the student's solution steps and the correct/false performance of the underlying competences. This teachers in their assessment, both formative and summative, by allowing them to playback the steps of the students' solutions as well as to ask for statistics about the correct/false performance of specific competences. The system has an Integrated Learning Management System (LMS).

Link: <https://users.sch.gr/dsklavakis/GeoGebra/MATHESIS.htm>

[2019 – Current] **The Maple Intelligent Algebra Tutor**

An intelligent, model-tracing system for tutoring expansion and factoring of algebraic expressions.



The system is implemented as a set of procedures in a Maple document that tutor a breadth of 18 top-level mathematical skills (algebraic operations).

Twelve (12) skills for expansion (monomial multiplication, monomial division and power of monomial, monomial-polynomial and polynomial-polynomial multiplication, parentheses elimination, collection of like terms, identities square of sum and difference, product of sum by difference, cube of sum and difference) and six (6) skills for factoring (common factor, identities square of sum and difference, product of sum by difference, quadratic form by sum and product, quadratic form by roots).

The system was embedded in DigitalEd's Mobius platform and was used experimentally in the European School of Brussels III

Links: https://www.youtube.com/watch?v=gRc5ZvEg8_E | https://europa.eu/europass/eportfolio/screen/redirect-external?url=https%3A%2F%2Fdoi.org%2F10.1007%2F978-3-030-41258-6_22

COGNITIVE TUTORS AND THE ACT-R THEORY OF LEARNING

I have studied the Atomic Components of Thought - Rational (ACT-R) cognitive theory of learning based on the concept of knowledge components (cognitive skills - competences) and problem-solving procedures, developed at Carnegie Mellon University. Attended a CMU summer school where I was trained in the tools for developing Cognitive tutors.

The MATHESIS Intelligent Algebra Tutoring School

During my Ph. D. studies, I have developed an intelligent model-tracing tutor for expanding and factoring algebraic expressions as well as an integrated LMS for online teaching and assessment.

Link: http://users.sch.gr/dsklavakis/mathesis/en/MATHESIS_Main_Frameset.htm

The MATHESIS Semantic Authoring Framework for Intelligent Tutoring Systems in Mathematics

During my Ph. D. studies, I have developed a Generic, Meta-Programming Framework for the development of Intelligent Tutoring Systems, using Semantic Web technologies like Ontologies and Web Services.

Links: http://users.sch.gr/dsklavakis/en/mathesis/kes2011/01-Authoring_Tools.mp4 | http://users.sch.gr/dsklavakis/en/mathesis/kes2011/02-Authoring_Processes.mp4



Math365 Project Proposal for Microsoft

Math365 Proposal for Integrating and Transforming Forms, Sharepoint and One Note Math Assistant into an Artificial Intelligent Math Tutoring School

HOBBIES AND INTERESTS

Memberships

- International Society for Artificial Intelligence in Education
- IEEE Industry Consortium on Learning Engineering (ICICLE)
- Hellenic Artificial Intelligence Society

Volunteer work

- Teacher of Mathematics at the Secondary School of the Greek-Orthodox Patriarchate of Jerusalem
- Development of an MS Access Database for the Human Resources department of the Directorate of Secondary Education.

Interests

- Basketball, Tennis
- Chess
- Cultural Travelling
- Reading
- Philosophy
- Advanced Technology Educational tools

ANNEXES

Upon request Certificates, Recognitions, Memberships, Recommendation Letters

MANAGEMENT AND LEADERSHIP SKILLS

Organisational and Managerial skills

Excellent planning, analytical and organizational skills, innovative, results-oriented and strongly motivated way of work.



COMMUNICATION AND INTERPERSONAL SKILLS

Communication skills

Excellent communication skills with the school management, national inspectors and the school staff, flexibility and adaptability, gained through my career as a coordinator in a multicultural and multinational environment as well as a Deputy Director in the dynamic, demanding and vibrant environment of a National Music School.

Professional skills

- Organising, supporting and facilitating workshops, seminars and conferences
- Coaching trainees
- Project management skills: preparing proposals and applications, monitoring progress
- Team-building and team management skills