Republic of Zambia

Ministry of Science, Technology, Vocational Training and Early Education

Junior Teacher Education Course

Computer Studies Syllabus

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COURSE: COMPUTER STUDIES

Preface

The area of Computer Studies has taken center stage in our world today. This is so because Computer Studies form the backbone of Information and Communication Technologies (ICTs) which are very important enablers for development. In fact, there can be no development in our world today without full utilization of computers. ICTs permeate throughout the areas of human endeavour. Consequently, it is paramount for any country that needs development to train teachers who are knowledgeable in Computer Studies and who can impart practical skills in learners that will enrich and enhance the learning process. This will eventually contribute to the nation's development.

The Ministry of Education, Science, Vocational Training and Early Education in line with the fulfillment of the millennium development goals (MDGs) has included Computer Studies in the primary and secondary curriculum in order to equip school leavers with life skills after completing their basic education. At the moment there are very few higher learning institutions who are training teachers in Computer Studies. This has posed a challenge in the learning and teaching of Computer Studies in schools under the new curriculum. This teacher training curriculum in Computer Studies therefore is designed to train teachers and alleviate the above challenges.

Introduction

The Computer Studies syllabus introduces learners to key computer concepts and skills. This will equip them with relevant knowledge to facilitate the teaching and the learning by pupils of Computer Studies at Junior Secondary level in Zambia. This Computer Studies syllabus is a response to the need to impart practical computer knowledge to children at an early age as outlined in the new curricula

from early child education to grade twelve. The syllabus emphasizes the context in which the teaching and learning of Computer concepts will take place. It provides the student teacher with the appropriate knowledge, values, teaching skills, pedagogy and competencies needed to function as an effective junior secondary school teacher.

It is important to underscore the fact that quality education promotes the development of knowledge, reasoning ability, concepts, skills, values and appropriate behavioral patterns. Therefore, this syllabus has combined subject content, andragogy, and pedagogy for effective delivery. A teacher can be inadequate if they cannot use effective methods or pedagogy in delivering knowledge to the learners. This means that content and methodology must be relevant to the teaching-learning process and consequently these have been considered in this syllabus.

Assessment

Computer studies is a practical subject and as such this syllabus places a lot of emphasis on the use of standard, commercial and major packages. It will therefore be the schools responsibilities to ensure that equipment and facilities that expose their learners to meet the minimum requirements for assessment purposes are acquired.

There will be two papers, one practical and one theory paper. This will be in addition to continuous assessment that will be set as school based assessment. Thus the examination of Computer studies will be divided into two sections. Computer studies is a practical subject and as such 50% of the specific outcomes belong to applications.

Continuous assessment by the College

1. Tests/Assignments/Seminars/Groupwork will amount to 40 % of the final mark

External assessment by the examination board

1. Theory (50 %)
2. Practical (50 %)

   The external assessment will amount to 60 % of the final mark

Aims

The syllabus aims to train Junior Secondary School teachers who will be knowledgeable in Computer Studies and able to impart practical skills in learners. Therefore, developing a comprehensive understanding of the learner-centred approach is an essential and core purpose of the syllabus. This approach advocates activity-based learning, critical thinking and enquiry, and objective continuous assessment.

General Outcomes

- Develop an understanding of computer hardware and software, Computer Security, networking and web design, basic programming and legal and professional issues
- Operate the computer efficiently and effectively

Key Competencies

- Demonstrate an understanding of the evolution of computers, key computer concepts, basic hardware components and data processing.
- Show an understanding of computer software, categories of computer software and software sources.
- Demonstrate an understanding of health and safety issues, care of computers and peripherals and computer security.
- Describe different ways in which computers can be used in our daily life.

- Demonstrate an understanding on how to use computer application packages such as word processor, spread sheets, databases, desktop publishing and presentation.
- Show an understanding of computer networking.
- Demonstrate an understanding of basic computer programming skills.
- Demonstrate an understanding of creating a website
- Show understanding of professional and legal issues in computers
- Demonstrate an understanding of emerging trends in methodology/pedagogy of teaching computer Studies in junior secondary school
- Demonstrate ability to plan to teach using appropriate teaching tools and interactive (learner-centred) approaches
- Demonstrate an understanding of skills and knowledge in assessing both teaching and learning.

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Computer Studies Junior Teacher Education Curriculum

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
YEAR 1			
1.1 Introduction to Computer Studies	1.1.1 The evolution of the computer	1.1.1.1 Describe the history and generations of computers 1.1.1.2 Discuss the advantages and disadvantages of computers 1.1.1.3 Compare between human beings and computers 1.1.1.4 Explain the configuration of computers	**DISCUSSION** • Learners to explain the origin of the computer **DEBATE** Learners to argue on: • Advancement of computers • Advantages and disadvantages of computers **GROUP/ PAIR ACTIVITIES** Learners to: • Explore and identify the parts of a computer • Connect a computer to the peripherals and to the power source • Discuss general categories of computers • Present on categories of computers based on configuration and data types **DEMONSTRATION (group/pair)**
	1.1.2 Computer concepts	1.1.2.1 Define computer, hardware, software, data, information and knowledge 1.1.2.2 Explain the concepts of ICT	
	1.1.3 Categories of computers	1.1.3.1 Examine the categories of computers	
	1.1.4 Basic hardware components of a computer	1.1.4.1 Describe the basic hardware components 1.1.4.2 Categorize the main components of computer hardware	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
		1.1.4.3 Discuss the processor components 1.1.4.4 Classify the main memory of a computer 1.1.4.5 Explain the processor speed 1.1.4.6 Contrast the two main types of storage (primary and secondary) 1.1.4.7 Describe storage capacities 1.1.4.8 Categorize types of secondary storage	Learners to: • Identify the hardware components of a computer and peripherals • Differentiate hardware and software components • Connect and switch on/off a computer • Use the key functions (keyboard and mouse) to operate the computer • Classify various parts of a computer • Discuss the types of storage • Determine different measurement of storage media • Relate file size to storage space • Explain the steps involved in data processing
	1.1.5 Computer peripherals	1.1.5.1 Explain computer peripherals 1.1.5.2 Describe types of computer peripherals and their uses	
	1.1.6 Data processing	1.1.6.1 Define data processing 1.1.6.2 Describe the fetch-execution cycle	
1.2 Computer Software	1.2.1 Introduction to software	1.2.1.1 Define software 1.2.1.2 Compare the two main types of software	**GROUP/ PAIR ACTIVITIES** Learners to: • Identify and distinguish the different types of software • Discuss the functions of operating systems
	1.2.2 Categories of software	1.2.2.1 Categorize the different types of system software (operating systems,	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
		utility, and language translators) 1.2.2.2 Classify the different categories of application software 1.2.2.3 Give examples of operating systems 1.2.2.4 Describe the main functions of operating systems 1.2.2.5 Distinguish among interfaces provided by operating systems	• Explore and identify different types of interfaces **DISCUSSION** Learners to: • Differentiate between the licensed and counterfeit software • Discuss the difference among multitasking, multiprogramming, multiprocessing • Identify sources of software
	1.2.3 Basic operations of a computer	1.2.3.1 Demonstrate how to operate an operating system such as Windows 1.2.3.2 Illustrate how to start and quit a program 1.2.3.3 Power up and down of computers and various technologies and peripherals 1.2.3.4 Perform basic computer operations 1.2.3.5 Interact with icons and menus in a Graphical User Interface (GUI) environment	**DEMONSTRATION (group/pair)** Learners to: • Turn the computer on and off • Operate a computer • Recognize and use icons on a computer • Insert memory cards, digital cameras, cell phones and related devices

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
	1.2.4 Software sources	1.2.4.1 Compare various sources of software (open source, in-house, bespoke, commercial off the shelf)	
1.3 Computer Ergonomics and Security	1.3.1 Health and Safety	1.3.1.1 Discuss the health and safety issues when using a computer	**ROLE PLAY** • In this act, learners to play out roles that depict the real life situation as instructed by the teacher (for example wrong use of a computer or any other situation) **GROUP/ PAIR ACTIVITIES** • Learners to demonstrate how to take care of computers (maintenance) **DISCUSSION** Learners to examine: • The health and safety • Threats • Computer security policy
	1.3.2 Care for computers and peripherals	1.3.2.1 Explain the care for computers and its peripherals	
	1.3.3 Security threats	1.3.3.1 Describe computer security threats 1.3.3.2 Categorize the threats (physical, software, intentional, accidental)	
	1.3.4 Computer Security	1.3.4.1 Define computer security 1.3.4.2 Discuss the need to protect data contained in a computer 1.3.4.3 Explain the causes of data loss in computers (hard disk failure, theft of data(fraud), virus attacks) 1.3.4.4 Justify the need of a computer security policy	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
		1.3.4.5 Select the measures for securing computers and their content such as locking premises, defining users, data back-ups, updating anti-viruses and so on.	
1.4 Computers in Everyday Life	1.4.1 Computers in the home environment	1.4.1.1 Identify the use of household appliances and devices that are controlled by embedded microprocessors 1.4.1.2 Discuss entertainment and recreational appliances	**GROUP/ PAIR ACTIVITIES** • Learners to identify the use of household appliances and devices that are controlled by embedded microprocessors **FIELD TRIP** • A trip to expose the learners to the use of computers from relevant industries **DEMONSTRATION (group/pair)** Learners to: • Connect home appliances and office equipment that are controlled by embedded microprocessors • Operate household appliances and devices that are controlled by embedded microprocessors
	1.4.2 Computers in the office environment	1.4.2.1 Explain the common uses of office equipment	
	1.4.3 Computers in the industry environment	1.4.3.1 Discuss with examples, the use of computers in industry	
	1.4.4 Computers in Schools	1.4.4.1 Identify the role that computers play in aiding learning 1.4.4.2 Explain social and economic effects of computers in schools	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
	1.4.5 Computer-based learning	1.4.5.1 Illustrate computer-aided instruction 1.4.5.2 Discuss e-learning (flexible and blended learning)	• Practice how to use social network (Skype, email and many others) for education purposes **DISCUSSION** Learners to: • Identify the social and economic effects of computers • Identify types of e-commerce
	1.4.6 Computers in Banking and e-commerce	1.4.6.1 Recognize the use of computers to organize, retrieve and process business transactions 1.4.6.2 Explain the linking of computers in different locations to enable electronic fund transfer e.g., Giro, NETS, Automated Teller Machines 1.4.6.3 Discuss magnetic cards and smart cards 1.4.6.4 Describe e-commerce and the process of purchasing goods and services online including point of sale 1.4.6.5 List advantages and disadvantages of e-commerce	
	1.5.1 Introduction to Word	1.5.1.1 Define the Word processor	**GROUP/ PAIR ACTIVITIES**

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
1.5 Productivity Tools (Word Processing)	processor and examples	1.5.1.2 List the examples of Word processors	• Learners to use the major features of a Word processor **DEMONSTRATION (group/pair)** Learners to: • Enter data in a word processor • Design documents • Operate the function keys (f1 to f12) and use keyboard shortcuts • Practice the functions of formatting and editing • Use save and save as commands when saving files to a specified storage media • Delete a file or folder and restore from the recycle bin • Use advanced features • Print the document
	1.5.2 Word Processor features	1.5.2.1 Identify the main features of a Word processor 1.5.2.2 Customize the Word Environment	
	1.5.3 Working with Word documents	1.5.3.1 Demonstrate how to work with Word documents (create, page layout, opening an existing document, editing, saving and closing)	
	1.5.4 Formatting	1.5.4.1 Illustrate different types of formatting styles (alignment, spacing, font, and others)	
	1.5.5 Graphics	1.5.5.1 Create graphics using basic graphic elements 1.5.5.2 Insert tables , Illustrations (picture, clip art, movies, audio) and symbols	
	1.5.6 Advanced functions	1.5.6.1 Demonstrate the use of additional functions performed by a Word processor (spelling and	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
		grammar, word count, mail merge, equations, calculations, table of contents, citation and bibliography, creating links)	
	1.5.7 Printing documents	1.5.7.1 Demonstrate the printing of documents	
1.6 Productivity Tools (Spreadsheets)	1.6.1 Introduction to spreadsheets	1.6.1.1 Define spreadsheets 1.6.1.2 List the examples of spreadsheets 1.6.1.3 Discuss applications of spreadsheets in organizations (employee records, business records, accounting, invoices and others)	**GROUP/ PAIR ACTIVITIES** Learners to: • Use the major features of spreadsheets • Explore different functions of spreadsheets **DEMONSTRATION (group/pair)** Learners to: • Input and edit data in spreadsheet • Switch between worksheet and workbooks • Design documents using spreadsheets • Use spreadsheet as a calculating tool • Link spreadsheet to word document by using hyperlink
	1.6.2 Spreadsheet features	1.6.2.1 Identify the features of a spreadsheet 1.6.2.2 Customize the spreadsheet environment	
	1.6.3 Working with spreadsheets	1.6.3.1 Demonstrate how to work with spreadsheets (create, save, open, enter data, close a workbook)	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
		1.6.3.2 Manipulate data in a workbook (select, copy, cut, and paste, undo, redo, autofill and others) 1.6.3.3 Modify spreadsheets (insert and delete cells rows and columns, find and replace) and others	• Sort data in predetermined sequence and filter data in a spread sheet • Interpret numerical data using graphs and charts • Print the spread sheets
	1.6.4 Performing calculations	1.6.4.1 Illustrate use of spreadsheet formulas (references, operators, constants, functions, labels, function library) 1.6.4.2 Demonstrate use of relative, mixed and absolute referencing	
	1.6.5 Sort and filter	1.6.5.1 Show the use of basic and custom sorting and filtering	
	1.6.6 Graphics	1.6.6.1 Add and edit a picture and clip art 1.6.6.2 Add shapes and smart art 1.6.6.3 Create and modify a chart 1.6.6.4 Use chart tools	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
	1.6.7 Saving and printing	1.6.7.1 Demonstrate how to print preview and print a workbook 1.6.7.2 Paginate using page break preview	
1.7 Productivity Tools (Desktop Publishing)	1.7.1 Introduction to Publishing	1.7.1.1 Define desktop publishing 1.7.1.2 List examples of desktop publishers 1.7.1.3 Discuss applications of publishers (business cards, brochures, posters, flex, web templates and others)	**GROUP/ PAIR ACTIVITIES** Learners to: • Use the major features of publisher • Design birthday cards, brochures and many others **DEMONSTRATION (group/pair)** Learners to: • Use pre-designed layouts or template for appropriate tasks • Modify already created publications • Publish a document • Import text, charts and pictures from other programs • Switch between two or more publishing packages • Save designs • Print designs
	1.7.2 Graphics Designs	1.7.2.1 Create various designs	
	1.7.3 Printing Publications	1.7.3.1 Illustrate printing publications	
YEAR 2			
2.1 Productivity Tools (Presentations)	2.1.1 Introduction to Presentations	2.1.1.1 Define presentations 2.1.1.2 List examples of presentations	*Note: This topic is meant to deepen the student-teacher's knowledge*

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
		2.1.1.3 Discuss applications of presentations	**GROUP/ PAIR ACTIVITIES** • Learners to use PowerPoint to design multimedia slides for presentation **DEMONSTRATION (group/pair)** Learners to: • Use multimedia in Presentations • Capture and edit images • Save audio and video files and to identify the file extension • Add narrations to slideshows • Print slides
	2.1.2 Presentation features	1.7.3.2 Identify the features of a presentations 2.1.2.1 Customize the presentation environment	
	2.1.3 Presentation design and formatting	2.1.3.1 Show how to create an effective presentation 2.1.3.2 Use styles and effects (font, font size, background, colour)	
	2.1.4 Multimedia and slide show	2.1.4.1 Demonstrate use of animations, effects, transitions, setting up slide show, slide show options 2.1.4.2 Insert audio and video 2.1.4.3 Add narration	
	2.1.5 Printing presentations	2.1.5.1 Print hand-outs from slides	
2.2 Teaching Methods and Techniques	2.2.1 Teaching tools and aids	2.2.1.1 Create Computer studies teaching tools (schemes of work, lesson plan, records of work)	**DEMONSTRATION** • Learners to create teaching tools **DISCUSSION** • Learners to discuss different teaching methods related to Computer studies
	2.2.2 Introduction to teaching methods	2.2.2.1 Discuss teaching methods	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
		2.2.2.2 Select teaching methods relevant to particular topics in Computer studies	
TEACHING PRACTICE			
2.3 Systems Analysis And Design	2.3.1 Introduction to systems analysis and design	2.3.1.1 Explain systems analysis and design concepts	***Note**: This topic is meant to deepen the student-teacher's knowledge*
	2.3.2 Development methodologies and modeling techniques	2.3.2.1 Discuss development methodologies (SDLC, agile methods) 2.3.2.2 Elucidate on data collection techniques 2.3.2.3 Illustrate modeling techniques such as data flow diagrams, entity relationship diagrams, use case diagrams, class diagrams 2.3.2.4 Outline the functions of a systems analyst	
2.4 Productivity Tools (Databases)	2.4.1 Introduction to Databases	2.4.1.1 Explain database concepts and data types 2.4.1.2 List examples of database systems	***Note**: This topic is meant to deepen the student-teacher's knowledge* **GROUP/ PAIR ACTIVITIES**

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
		2.4.1.3 Discuss applications of database systems	• Learners to use the major features (including manipulation) of database software **DEMONSTRATION (group/pair)** Learners to: • Create a database application • Print the reports from database
	2.4.2 Database Design	2.4.2.1 Design a simple database (conceptual design using E-R modelling)	
	2.4.3 Database creating and utilizations	2.4.3.1 Create a database using MS Access (student records, employee records and business stock) 2.4.3.2 Design tables forms and reports 2.4.3.3 Create tables and forms 2.4.3.4 Write queries 2.4.3.5 Generate reports	
	2.4.4 Printing Reports	2.4.4.1 Demonstrate the printing of database reports	
2.5 Computer Networks	2.5.1 Introduction to Computer Networks	2.5.1.1 Define computer network 2.5.1.2 Justify the importance of networking 2.5.1.3 State the advantages and disadvantages of networking	**GROUP/ PAIR ACTIVITIES** Learners to: • Connect a small network • Identify and explain the use of various network devices • Outline the layers in the OSI and TCP/IP model
	2.5.2 Communicatio n media	2.5.2.1 Discuss with examples various wired and	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
		wireless communication media	• Identify Internet security threats and measures to prevent them **DEMONSTRATION** Learners to: • Open web browsers • Share different media files from external storage devices and internal storage devices • Use web browsers to access websites • Retrieve information and multimedia from the websites • Use internet communication tools (skype, twitter and many others) • Create email accounts • Send and receive email
	2.5.3 Network Classifications	2.5.3.1 Classify the types of networks	
	2.5.4 Network devices	2.5.4.1 Describe various network devices such as modem, hub, switch, router, bridge, gateway	
	2.5.5 Network Topologies	2.5.5.1 Discuss the various network topologies	
	2.5.6 The Internet, Intranet and extranet	2.5.6.1 Distinguish among Internet, intranet, extranet and virtual private network 2.5.6.2 Describe how the Internet works (OSI and TCP/IP model in outline)	
	2.5.7 Internet Security	2.5.7.1 Define Internet security 2.5.7.2 Discuss Internet security concerns 2.5.7.3 Provide the measures that can be used to secure the Internet	
	2.5.8 Websites and web browsers	2.5.8.1 Describe the World Wide Web 2.5.8.2 Explain a web page, web site and web browser	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
		2.5.8.3 List examples of web browsers and websites	
	2.5.9 Search Engines	2.5.9.1 Define search engines 2.5.9.2 Give examples of search engines	
	2.5.10 Electronic mail	2.5.11 Explain electronic mail (e-mail) and its purpose 2.5.12 Describe the format of an e-mail address 2.5.13 Use the send and reply-to features in e-mail. 2.5.14 Demonstrate how to create an e-mail account	
TEACHING PRACTICE			
3.1 Basic Computer Programming	3.1.1 Introduction to Programming	3.1.1.1 Describe programming 3.1.1.2 Classify the programming languages	***Note**: This topic is meant to deepen the student-teacher's knowledge*
	3.1.2 Programming structures	3.1.2.1 Describe the structure of a program	
	3.1.3 Algorithms and flowcharts	3.1.3.1 Construct an algorithm 3.1.3.2 Design a flowchart	
	3.1.4 Data types	3.1.4.1 Describe data types 3.1.4.2 Classify the data types (built-in and user defined)	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
	3.1.5 Conditional and controlled statements	3.1.5.1 Write conditional and controlled statements	
	3.1.6 subroutines/sub functions	3.1.6.1 Explain subroutines and functions 3.1.6.2 Classify types of subroutines and functions 3.1.6.3 Develop subroutines and functions	
3.2 Introduction to the Programming Language	3.2.1 Introduction to a procedural language such as C	3.2.1.1 Discuss procedural languages with examples 3.2.1.2 Illustrate the input and output statements of C language 3.2.1.3 Write a basic C program	***Note**: This topic is meant to deepen the student-teacher's knowledge*
3.3 Web Designs	3.3.1 Introduction to Web design and development	3.3.1.1 Explain Web design and development	**DISCUSSION** Learners to: • Identify the components of a URL • Discuss major features of web 1.0, web 2.0 and web 3.0 • Evaluate Internet languages • Create a simple static website
	3.3.2 Identifying web documents	3.3.2.1 Illustrate the format to specify a web document (URL) 3.3.2.2 Explain the components of a URL	

TOPIC	SUB TOPICS	SPECIFIC OUTCOMES	SUGGESTED INSTRUCTIONAL PEDAGOGY
	3.3.3 Types of websites	3.3.3.1 Distinguish between static and dynamic websites	
	3.3.4 Internet languages (HTML)	3.3.4.1 Examine Internet languages 3.3.4.2 Create a simple website (static)	
3.4 Legal and Professional Issues	3.4.1 Introduction	3.4.1.1 Discuss the legal and professional issues in Computing	**DISCUSSION** Learners to: • Highlight major legal and professional issues • Differentiate between ethics and legal issues
	3.4.2 Intellectual property	3.4.2.1 Interpret the Intellectual property rights	
	3.4.3 Copyright	3.4.3.1 Give examples of copyright property 3.4.3.2 Discuss the laws related to copyright	
	3.4.4 Licensing	3.4.4.1 Discuss end user licensing agreement	
	3.4.5 Computer ethics	3.4.5.1 Discuss ethics in computing 3.4.5.2 Compare ethics and legal issues 3.4.5.3 Interpret the Data Protection Act	
	3.4.6 Computer user policies	3.4.6.1 Discuss the user policy documents	

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