E-learning tools for Food technology and development education (E-Food) – a comprehensive e-learning platform and databases

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Introduction

The E-Food project is aimed at digitization of the educational process in the field of food technology and the development of new food products. One of the main goals of the project is the creation of e-learning tools as an element of a platform and a digital hub for training students in the field of food technology.

The aim of the present work is to present e-learning tools, developed by PHP and MySQL, designed to elucidate the scientific intricacies surrounding local food products in partner countries, their production processes, raw materials and ingredients, and innovative techniques employed within the food technology area.

Materials and Methods

The aim of the present work is to present e-learning tools, developed by PHP and MySQL, designed to elucidate the scientific intricacies surrounding local food products in partner countries, their production processes, raw materials and ingredients, and innovative techniques employed within the food technology area.

№	Product name / original language/	Product name / English/	Country of origin	Region (if applicable)	Product type	Main production processes	Innovations	Certification	Short description	Full description	External links
12	Сирене "Дунавия"		Bulgaria		Dairy		Inovative	PGI		LINK	LINK
55	Paste fără gluten	Gluten free pasta	Romania		Cereal	Drying	Inovative	No		LINK	LINK
57	Vin fără alcool	Alcohol free wines	Romania		Beverages	Extraction	Inovative	No		LINK	LINK
61	Baton din cereale	Cereal bar	Romania		Confectionary	Cooking; Mixing	Inovative	No		LINK	LINK
70	PurPur kenyér	PurPur bread	Hungary		Bread		Inovative	No		LINK	LINK
71	Túró rudi	Chocolate or fruit coated curd cheese snack	Hungary		Dairy		Inovative	No		LINK	LINK
72	Málnás csokoládé	Chocolate bar with strawberry flavouring	Hungary		Confectionary		Inovative	No		LINK	LINK
73	Rügykivonatok	Gemmotherapy extracts *	Hungary		* as food supplement	Inovative	No			LINK	LINK

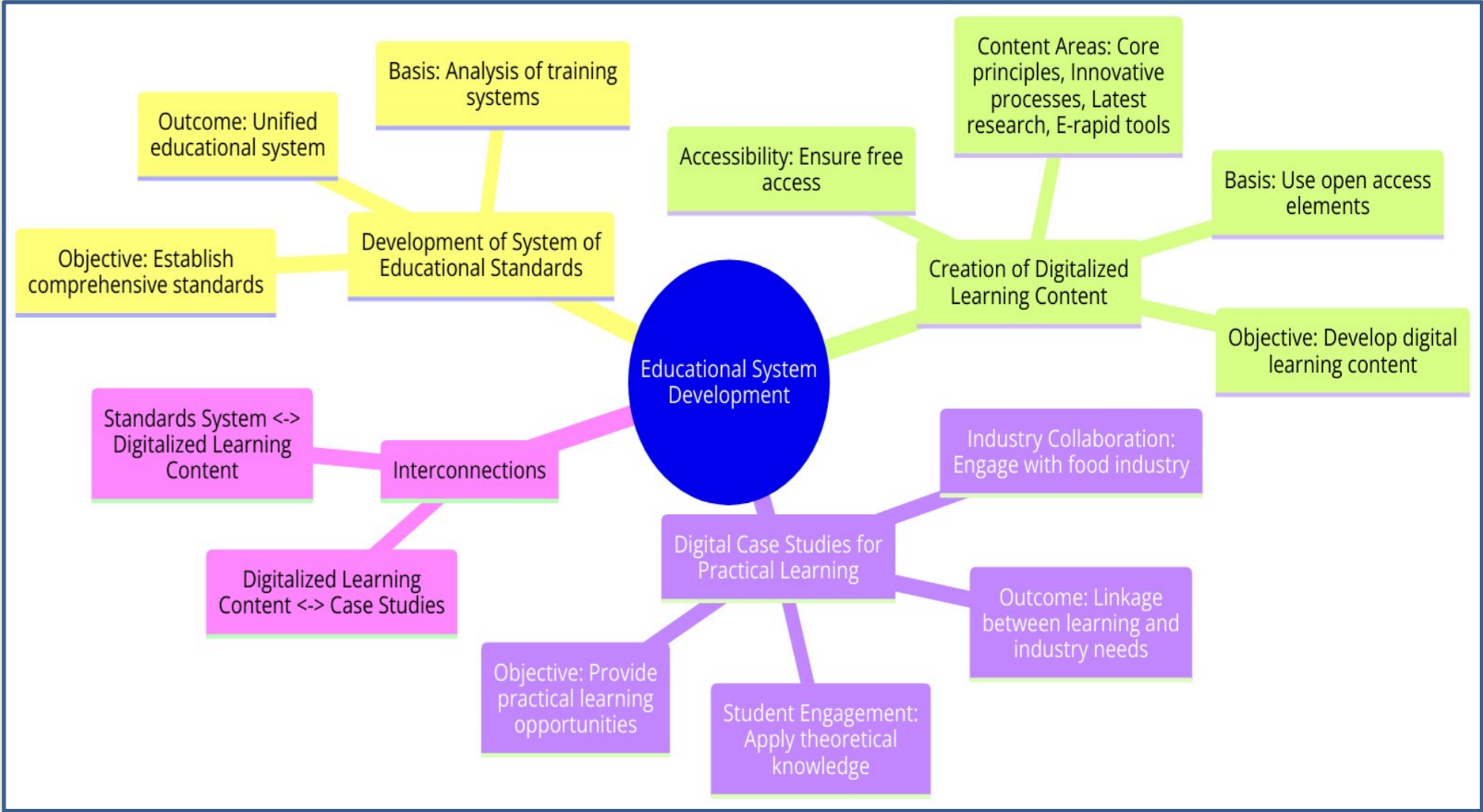|	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
☐	1	Id 🔑	int(10)		UNSIGNED	No	None		AUTO_INCREMENT
☐	2	Product_name_o	varchar(300)	utf8mb4_general_ci		No	None		
☐	3	Product_name_e	varchar(150)	utf8mb4_general_ci		No	None		
☐	4	Country_of_origin	varchar(50)	utf8mb4_general_ci		No	None		
☐	5	Region	varchar(150)	utf8mb4_general_ci		No	None		
☐	6	Product_type	varchar(50)	utf8mb4_general_ci		No	None		
☐	7	Main_production_processes	varchar(350)	utf8mb4_general_ci		No	None		
☐	8	Innovations	varchar(50)	utf8mb4_general_ci		No	None		
☐	9	Certification	varchar(10)	utf8mb4_general_ci		No	None		
☐	10	Short_description	varchar(1300)	utf8mb4_general_ci		No	None		
☐	11	Full_description	text	utf8mb4_general_ci		No	None		
☐	12	External_links	text	utf8mb4_general_ci		No	None		

Due to necessity of storing multilingual data from users in countries like Spain, France, Romania, Bulgaria, and Hungary, the use of the utf8mb4 character encoding in the database is crucial. This encoding supports a wide range of Unicode characters, including special characters, accented letters, and symbols used in these languages. For example, while UTF-8 can handle most Western European languages, utf8mb4 extends this support to four-byte characters, enabling the storage of emojis and other symbols commonly used in modern communication. This is particularly important for ensuring data integrity and consistency when dealing with user-generated content across diverse linguistic contexts, avoiding potential truncation or misinterpretation of data. Furthermore, using utf8mb4 enhances the database's ability to accommodate a growing range of character sets as more participants may join.

Within the framework of the E-Food project, an analysis of the existing e-learning platforms in the partner universities of the project was carried out. Significant differences were found in the digital platforms used. It was also established that the existing digital platforms in most cases do not allow virtual mobility of students and teachers, which limits the possibility of implementing various priority activities promoted by the European Commission. As a result of the analysis of the obtained results through PHP and MySQL, a training platform, based on databases for different types of products, raw materials, processes and others, has been created. The combination of PHP and MySQL forms is a powerful foundation for web development. For our system we will use InnoDB as a storage engine for MySQL. It offers several key benefits, including ACID-compliant transactions, which ensure reliable and safe data management with automatic crash recovery. InnoDB also features row-level locking, which enhances concurrent access and reduces contention, thereby improving performance in multi-user environments. Additionally, its use of clustered indexes improves the speed of data retrieval, making InnoDB a robust choice for handling large databases with high transactional workloads.

Using lightweight custom PHP platform for web development offers several advantages over pre-built CMS platforms like WordPress, Joomla or Drupal. Custom PHP allows for more precise control over the website's functionality, leading to optimized performance and faster load times, as it avoids the overhead associated with the numerous plugins and features bundled in CMS systems. This approach also enhances security by reducing vulnerabilities commonly targeted in widely-used platforms like WordPress, which are more susceptible to attacks due to their larger user base and standardized code. Additionally, custom PHP development allows for greater flexibility and scalability, enabling developers to build tailor-made solutions that meet specific project requirements without the constraints imposed by a CMS framework. This can result in cleaner, more maintainable code and a more streamlined user experience.

Google Login for Google Workspace for Education offers significant benefits to universities by streamlining access and enhancing security. With single sign-on (SSO) integration, students, faculty, and staff can use their institutional Google accounts to easily access a wide range of university resources, including login to E-food learning platform. This centralized authentication reduces the need for managing multiple login credentials, improving the user experience and minimizing technical support issues related to forgotten passwords. Furthermore, Google Login leverages Google's robust security features, such as two-factor authentication and real-time threat detection, providing enhanced protection for sensitive academic and personal data. Additionally, administrators can manage user permissions more efficiently, ensuring that only authorized individuals have access to specific resources, such as certain access to information or removing a graduated student.