SMART TEXTILES DIGITALIZATION USING CREATIVE METHODS

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This paper presents several aspects concerning the digitalization implementation using creative learning and teaching methods in the Erasmus+ DigiTEX project framework. The DigiTex project developed an e-learning platform for the course and end-users management. The students and teachers accessed the platform after enrolling, which allows an association of the end-users with the universities. The database associated with the e-learning platform contains information about students, teachers, course categories and contains. In the framework of the DigiTEX Erasmus+ project, the e-learning platform Moodle DigiTEX was used during the Intensive Study Program in Athens, Greece (2022) and will be used in multiplier events by all partners.

Keywords: textile, digitalization, courses, e-learning.

INTRODUCTION

The e-learning tools and methods are very attractive for students not only in the context of the pandemic crisis (Huang *et al*., 2013; Zabolotniaia *et al*., 2020; Petrisor, 2021; Pastore *et al*., 2021), helping to increase motivation (Oproiu, 2015; Radulescu *et al*., 2022; Islam *et al*., 2022; Blaga *et al*., 2019), understanding lesson by individual study and avoiding the inconvenient of distance. Some studies show that for EFL Master students, e-learning courses can have a negative impact (Benadla and Hadji, 2021; Babalola *et al*., 2022).

In addition, a challenge in e-learning tools is to select the best tools, considering the system quality and facilities (Makruf *et al*., 2022).

In the context of the Intensive programs for higher education learners C1 - Creative methods for co-design/co-development of medical, protective, sensorial and smart textiles, the DigiTex consortium and students involved had the opportunity to test the e-learning Digitex Moodle platform and use it for individual study of the courses.

DIGITEX PLATFORM

In the project, Erasmus+ DigiTEX, a course management system (CMS) was used to create the e-learning DigiTEX Moodle platform (e-digitex.eu/moodle). This platform was customized for learning management to host learning materials (courses, videos, quizzes, grades, groups) necessary for learning and multiplier events. The end-users (students, trainers, professors) can easily connect to the DigiTEX Moodle platform using the section outputs from www.e-digitex.eu (Figure 1).

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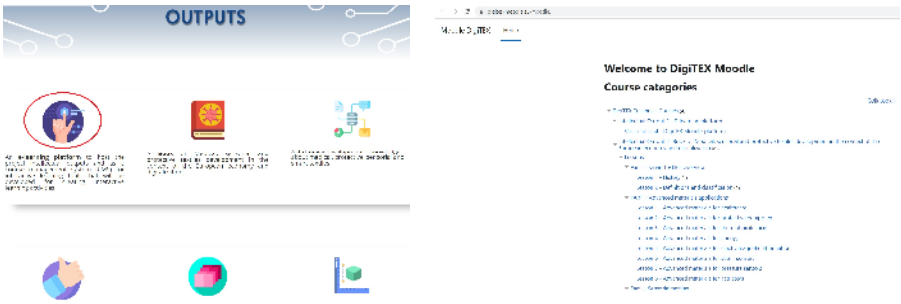

a.Moodle platform access from e-digitex.eu/outputs

b. DigiTex Moodle platform

Figure 1. DigiTex Moodle platform

The user login ensures the safety and privacy of sensitive personal data. The website administrator can enroll the users, and a password is generated automatically; the user is notified instantly. In this case, the user can change the password and is notified by email to access the link, which is valid for 30 minutes (Figure 2).

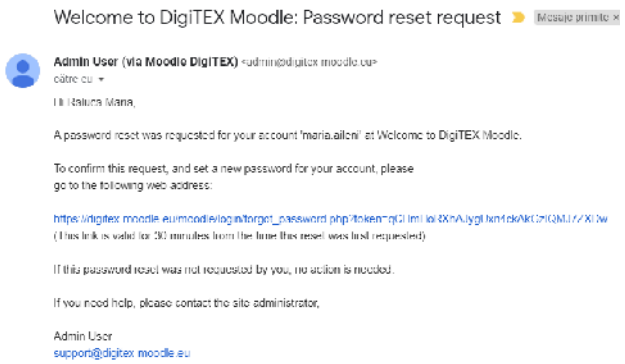

Figure 2. Password reset request

The platform integrates a database to manage the knowledge necessary for intellectual activities, learning, and teaching events. The information was adequately structured in a database for learning teaching activities in courses organized by categories.

The DigiTEX database developed contains several tables:

➔mdl_course_categories (Figure 3);
➔mdl_course (Figure 4);
➔mdl_enroll_student (Figure 5);
➔mdl_enroll_teacher (Figure 6).

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#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id	bigint			No	None		AUTO_INCREMENT	Change Drop More
2	name	varchar(255)	utf8_unicode_ci		No				Change Drop More
3	idnumber	varchar(100)	utf8_unicode_ci		Yes	NULL			Change Drop More
4	description	longtext	utf8_unicode_ci		Yes				Change Drop More
5	descriptionformat	tinyint			No	0			Change Drop More
6	parent	bigint			No	0			Change Drop More
7	sortorder	bigint			No	0			Change Drop More
8	coursecount	bigint			No	0			Change Drop More
9	visible	tinyint(1)			No	1			Change Drop More
10	visibleold	tinyint(1)			No	1			Change Drop More
11	timemodified	bigint			No	0			Change Drop More
12	depth	bigint			No	0			Change Drop More
13	path	varchar(255)	utf8_unicode_ci		No				Change Drop More
14	theme	varchar(50)	utf8_unicode_ci		Yes	NULL			Change Drop More

Figure 3. Table mdl_course_categories – DigiTex Moodle

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id	bigint			No	None		AUTO_INCREMENT	Change Drop More
2	category	bigint			No	0			Change Drop More
3	sortorder	bigint			No	0			Change Drop More
4	fullname	varchar(254)	utf8_unicode_ci		No				Change Drop More
5	shortname	varchar(255)	utf8_unicode_ci		No				Change Drop More
6	idnumber	varchar(100)	utf8_unicode_ci		No				Change Drop More
7	summary	longtext	utf8_unicode_ci		Yes				Change Drop More
8	summaryformat	tinyint			No	0			Change Drop More
9	format	varchar(21)	utf8_unicode_ci		No	topics			Change Drop More
10	showgrades	tinyint			No	1			Change Drop More
11	newsitems	mediumint			No	1			Change Drop More

Figure 4. Table mdl_course – DigiTex Moodle

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	ID	bigint			No	None			Change Drop More
2	Enroll	varchar(20)	utf8mb4_unicode_ci		No	None			Change Drop More
3	Identification Code	int			No	None			Change Drop More
4	Name	char(40)	utf8mb4_unicode_ci		No	None			Change Drop More
5	Password	varchar(20)	utf8mb4_unicode_ci		No	None			Change Drop More
6	CourseID	bigint			No	None			Change Drop More
7	University	varchar(40)	utf8mb4_unicode_ci		No	None			Change Drop More

Figure 5. Table mdl_enroll_student – DigiTex Moodle

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	ID	bigint			No	None		AUTO_INCREMENT	Change Drop More
2	Enroll	bigint			No	None			Change Drop More
3	University	varchar(40)	utf8mb4_unicode_ci		No	None			Change Drop More
4	Name	char(40)	utf8mb4_unicode_ci		No	None			Change Drop More
5	ID Course	bigint			No	None			Change Drop More
6	Username	varchar(20)	utf8mb4_unicode_ci		No	None			Change Drop More
7	Password	varchar(20)	utf8mb4_unicode_ci		No	None			Change Drop More

Figure 6. Table mdl_enroll_teacher – DigiTex Moodle

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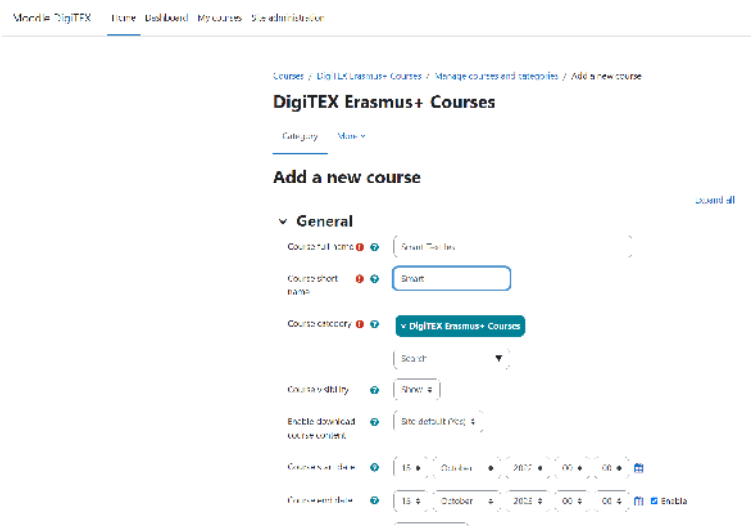

Figure 7. Teacher account – creating new courses

The platform developed allows login for 3 types of users (administrator, teacher (Figure 7) and student), each with different permission rights. The administrator can add courses can enroll/remove students and teachers from a specific course. The teacher can create courses (Figure 7), and the user students can see enrolled courses (figure 8).

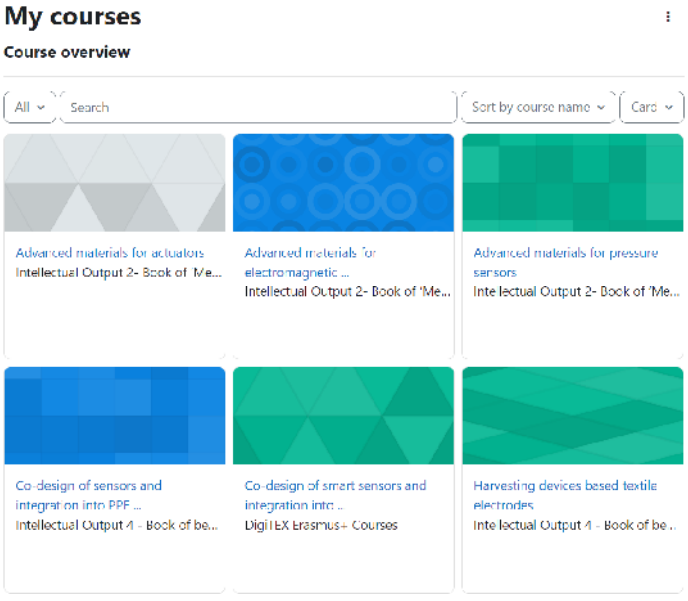

Figure 8. Student account – course overview

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In the framework of the DigiTex project, the INCDTP integrated into DigiTex Moodle platform six-course modules (Advanced materials for pressure sensors, Advanced materials for actuators, Co-design of smart sensors and integration into medical devices, Advanced materials for electromagnetic attenuation, Harvesting devices based textile electrodes, Co-design of sensors and integration into PPE products for fire and water protection).

CONCLUSIONS

In the intensive programmes for higher education learners C1 - Creative methods for co-design/co-development of medical, protective, sensorial and smart textiles, the students appreciated that this tool is very attractive, friendly and valuable for interactive and individual learning using creative methods. However, online learning cannot replace classical learning methods but can provide new added value. In the framework of the DigiTex Erasmus+ project, two intellectual outputs having course results have been integrated into the Digitex e-learning platform.

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