

Educational Transformation for the 21st Century - EduTrans21



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„ RecycleHUB” – A BUSINESS CASE FOR A 20 HOURS COURSE FOR IT SPECIALISTS

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Integrated within EduTrans21 Project

The educational profile of IT specialists embraces different areas, not only programming or network technology but also activities with a commercial touch. Because companies have to sell services and hardware successfully.

As a relatively simple **business case** the sale of customised hardware and software is a frequent business transaction. Calculations must also be considered.

As module designer we will analyse the specific process of this business case starting with the preparation of the first meeting with the customer up to the development of the offer and the presentation in front of the customer including a recommendation.

The educational profile of IT specialists embraces different areas, not only programming or network technology The students have the competences to make the design and structure of software products necessary for the implementation of: software systems, software applications, databases, WEB pages. (design, develop, and maintain websites and web applications)

The students have the skills and technologies necessary to. customize, configure and modificate a software applications in order to adapt the client's information systems.

Within a project, the students inform themselves about mapping of information using data. They analyze data , the origin, type, availability, data protection, data security and storage requirements and consider data formats and storage solution.They plan the costumisation of an application to manage the databases and develop test case. They use the core web technologies: HTML for structure, CSS for styling, and one of back-end programming language(PHP).

The students understand the database concepts and they have the ability to work with relational (e.g., MySQL) databases.

The students implement the customisation of the application, also in a team, and create software documentation. They tell the function of the application and assess its suitability to fulfil the requirements. They evaluate the software development process.

Within a project it is important to create an appropriate framework for the implementation of awareness activities for actions for sustainable development, which can lead to the fulfilment of the 17 Sustainable Development Goals (SDGs) provided for in the UN 2030 Agenda. The project also aims to develop transdisciplinary educational activities, which include various concrete actions regarding the Sustainable Development Objectives.

- **Subject matter skills**

The students are able:

- To analyse customer requirements
- To develop use cases according to customer situation
- To define an appropriate development environment
- To understand the need to achieve the UN Agenda 2030 regarding the Sustainable Development Goals,
- To familiarize themselves with THE SDG's, so that they can work with these goals in activities subsequent.

- To develop conceptual and logical database design based on customer requirements
- To use ERD models
- To normalize a database using THE Normal Forms
- To implement SQL statements for databases
- To define test cases
- To develop a GUI with database connection using PHP or Python with SQL server
- **Transversal skills**

The learners are able:

- to contribute effectively in a team, fulfilling tasks as agreed
- to agree on specific scrum roles for each team mate
- to use a scrum board with backlog and sprint planning
- to communicate appropriately with customers and team mates
- to present own results target group orientated

- **Expected results**

As for learning outcomes important we need results as orientation for the students

- Determine Team roles and set team rules
- Analyse the scenario. The problems and customer requirements
- Familiarizing students with the UN Agenda 2030 regarding the Sustainable Development Goals
- Set up a Scrum Board
- Create a PERSONA
- Create the website (structure and contents)
- Design the conceptual and logical database design
- Designing the Forms (input fields) and connecting to the created database
- Using PHP and My SQL for add, delete, modify data in the database
- Developing a specification list for hardware, software and services based on the results
- Developing a presentation for the customer

Defining a Scenario based on business Case

*In Sibiu, a group envisions **RecycleHub**, an upcoming online hub promoting eco-friendly living. Anticipated features include interactive tools and local recycling information, simplifying sustainable choices. Stay tuned for the launch event, where RecycleHub aims to inspire residents to adopt greener lifestyles, helping people live cleaner and sustainably in Sibiu and Romania.*

Our site's purpose is to be an initiation platform for all those who are interested in improving the quality of life in the neighbourhood/ city by recycling. Here you will find information about how recycling works, where and what you can recycle, as well as a community tied by their shared interest in forming a better future.

A customer visiting our recycling website would likely have several expectations and desires. Here are some key features and information that a well designed recycling website should provide to meet customer needs:

- **Easy to Use:**
 - *Make the website easy to navigate.*

- **Local Info:**
 - Provide details on nearby recycling centers and pickup services.
- **Accepted Items:**
 - Clearly list what items can be recycled and how to prepare them.
- **Environmental Impact:**
 - Share why recycling matters and its positive effects.
- **Learn and Share:**
 - Offer tips on better recycling and shareable content for social media.
- **Events and Updates:**
 - Highlight local recycling events and any news or changes.
- **Mobile-Friendly:**
 - Ensure the site works well on phones.
- **Help and Feedback:**
 - Provide contact info for support and ways to give feedback.
- **Know the Rules:**
 - Share local recycling laws and any updates.
- **Rewards:**
 - Mention any rewards or loyalty programs for recycling.
- **Calculate Impact:**
 - Include tools to estimate recycling's environmental impact.
- **Stay Updated:**
 - Allow users to subscribe for regular recycling news.

We want to link our platform to the **Goal 11** (Make cities and human settlements inclusive, safe, resilient and sustainable) and **Goal 12** (Ensure sustainable consumption and production patterns), the SDG's from UN Agenda 2030.

The argument behind it is that it is imperative now for every person to contribute to improving the community they live in. Each of us is responsible for that. However, we as regular people need to be given the means/ tools to be able to do that in an efficient way. Thus, the RecycleHub platform offering all the info necessary about recycling - what material can be recycled, where are the centres you can recycle and also some incentives/ rewards to encourage people.

Why is this needed?

Today's people are always in a hurry, time is money. We are also very comfortable so we need to be helped into.

PERSONA

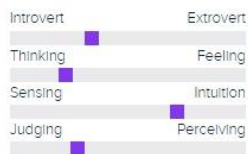
Alex



"Coding a sustainable future in bytes and recycling for a cleaner Earth."

Age: **23**
Work: **Software engineer**
Family: **Married**
Location: **Sibiu, Romania**
Character: **Everyman**

Personality



Goals

- Alex wants to become more environmentally conscious and reduce the amount of waste they generate. They want to learn how to properly sort and recycle trash and dispose of hazardous waste. They also want to find ways to reduce their carbon footprint and live a more sustainable lifestyle.

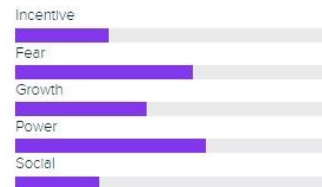
Frustrations

- Alex finds it difficult to remember to sort and recycle trash. They are also unsure about which items can be recycled and which cannot. They often feel guilty about the amount of waste they generate but don't know how to reduce it. They also find it difficult to make time for recycling due to their busy schedule.

Bio

Alex is a busy person who is always on the go. They are a logical and analytical thinker who enjoys solving complex problems. They are not very detail-oriented and tend to overlook small things. They are also a bit forgetful and often forget to sort and recycle trash. They are a kind and empathetic person who cares about the environment but finds it difficult to make time for recycling.

Motivation



Preferred Channels



Outline of the course

The course lasts 20 hours in total. Students will find all resources on the school platform Classroom,. To specific topics inputs will be given. These inputs can be requested by students. Other inputs will be published. The expected results will be explained and the dates for the review will be given. Assessment criteria are available on Classroom in terms of Moscow criteria. Enquiries to the teacher are possible in the computer classes or email. The teacher will answer these questions in individual meetings or with hints and materials.

Expected are KANBAN boards from each team. Teams will work according to scrum principles. The classes will start with dayless to clarify status of the work and possible blockers.

Interactivity

To all subsequently listed resources exercises with proposed solutions are available. Furthermore, knowledge related materials will include online tests. Students can learn the required basic knowledge and skills assisted by the teacher, in the 3 class hours per week and self-organized. In our case interaction is ensured on different levels:

Learner to learner via SCRUM roles

Learner teacher via Google Meet and a time table for inputs and for discussions

Learner to tutorials on demand is part of the introduction.

Collaboration

This point is completely covered by SCRUM principles. Firstly, the roles of SCRUM master, tech master and product owner are assigned to team members. Furthermore, sprint planning leads

to individually assigned tasks with an internal review of the results. Twice a week, retrospectives and peer feedback are further approaches to ensure an intense collaboration. For each process phase there is an introduction on how to carry out the steps.

Communication

Communication was already mentioned above.

Inputs/ Resources

- Project management with SCRUM
- Available SCRUM Tools (ex KanbanFlow)
- Introduction in HTML and CSS - materials
- PHP scripting language
- Online Web Tutorials about how to make a webpage (e.g. <https://www.w3schools.com/>)
- Database Theory. Conceptual and logical model for Databases (ERD)
- Normalization
- SQL language
- Programing Interactive User Interface
- Connecting Databases with User Interface

Assessment

The students got a time table and a checklist for peer-feedback and dates for the final assessment.

Basis for the final assessment is a list of MOSCOW criteria.

MOSCOW Evaluation Criteria

Task	Must have	Should have	Could have	Won't have this time
Design	Arranging and organizing website elements on a visual hierarchy Using a typography that's easy to read and skim.	A consistency design throughout the site to provide a uniform experience. Using the same layout for all pages	Ensure the website works seamlessly across all devices (responsive design)	
Content	The content of the website should be relevant to the target audience.	Web pages should have titles that describe their function or purpose.	Refresh and update the existing content for accuracy and relevance.	Automatic update of the content
Navigation:	Enhance the user experience with more intuitive navigation.	A menu visible on all the pages.	Link on the Logo to the Homepage All features are working with GUI	Include a Sitemap
Interactivity and functionalities	The forms, are easy to fill out and submit. PHP tags used for communication with the website	PHP tags are saved in a separate file Include a contact form for inquiries	User defined function in PHP Include a embedded Google Map for location	PHP security advanced feature
Database	Database implemented ERD is correct. Relation defined 3 rd normal form	My SQL statements are used to link the data from forms to the database	Existing a GUI interface for administration	
Social Media Integration:	Include links to the social media profiles to encourage visitors to connect and follow	Allow users to share content on social platforms	Introduce a blog for regular updates and engagement	
User Registration	Enable users to create accounts for personalized experiences.	Users accounts will be saved in a database.	User could have some benefits after login	
Multilingual Support			Provide content in multiple languages for a wider audience	

E-commerce Integration		Some -commerce features should be use for the current scope		
Advanced functionality			Implement advanced search features for content discovery	Web analytics tools to track user traffic and behavior. SSL: Make sure the site provides secure connections via HTTPS.
Security:				Protection against attacks: Implementation of security measures to protect the site against cyber attacks.

Story Board

Story board /	Interaction (on/off)	Collaboration	Communication	Result	Resources
Presenting the challenge Face to Face (F2F)	<i>Explanation</i> of the framework for the upcoming learning process <i>Introduction</i> of the challenge and the link to the scenario F2F but with LMS and media	Teacher- students	Rules for communication	Clear picture for the next lessons and the challenge	Scenario on Classroom Gamification Perhaps video Online for repetition
Structuring the problem and defining a list of sub tasks F2F	Team definition randomized	Team work	Teams communicate and document the ideas concerning required sub tasks and processes	List of sub tasks	Scenario with detailed information about departments and general needs
Team building for the project F2F	Introduction into SCRUM	Teacher- students	Students decide teams Team roles according to SCRUM	Teams are ready to start working	Video tutorials and articles to SCRUM on LMS

			Set up of KANBAN board		
Presentation of SDG's F2F	Introduction into SDG's	Teacher- students	Discussion of contents	Final decision on the SDG's targeted with the project.	Internet. Materials posted in Classroom with videos and quizzes
Preparing the research online	Group discussion	Sprint planning Standards for research	Distributed research	Appropriate offers for purchasing	Internet
Creating the website structure and design F2F	Learning HTML and CSS from example and from materials Repetition with tests	Team work	If necessary request of input	Template of the website The user interface features for the header area (top of page), footer area (bottom of page), and along the site.	Materials posted in Classroom with videos and tests as well as exercises and solutions Online Web Tutorials (eg. https://www.w3schools.com/)
Add and manage the website contents. Webpage-level planning. Online or F2F	Group discussion	Team work	Discussion of contents	The design of the website	Internet Online Web Tutorials (eg. https://www.w3schools.com/)
Building the conceptual model of the database	Teacher organises the talks according to role play rules (peer groups)	Moderator, time manager and minute taker	Real discussion between the peer groups	The ERD schema of the database	Material posted in Classroom with example Video tutorials
Retrospective Online or F2F	Group discussion Using online tools for documentation	Group decides action items	Real discussion between the peer groups	Two action items for improving teamwork	Module retrospective Learned - liked - lacked
Creating the database of the project using PHP My Admin module. Online or F2F	On request teacher input	Team work	Further explanations provided by the teacher, in case more clarification is needed	The database of the project	
Designing the Forms (input fields) and connecting to the	On request teacher input	Team work	Further explanations provided by the teacher, in case more clarification is needed	Contact forms	Material on classroom Online WebTutorials (eg.

created database .Online or F2F					https://www.w3schools.com/
Using PHP and My SQL language for add, delete, modify data in the database Online or F2F	On request teacher input	Team work	Further explanations provided by the teacher, in case more clarification is needed	My SQL Queries	Material on classroom Online WebTutorials (eg. https://www.w3schools.com/)
Staging the Website Online	Group discussion	Distribution of work	Discussion within each group	The website	
Developing a presentation for the customer Online or F2F	Online in teams	Distribution of work	Discussion of contents	Presentation for the pitch	Templates on LMS
Presentation F2F	Organisation of a market place Presentation of results	Team work	Peer feedback based on checklists	First part of assessment, each group with at least three feedback documents	Feedback standards on LMS
Final Assessment	Teacher assessment based on submitted documents			Final marks for the groups	Moscow criteria on LMS

Final remarks

The case example is one possible solution. There are a lot of different solutions possible. It depends on the maturity of the learners, the subject and the technical equipment.

In the above mentioned case a lot of requirements for competence development are covered by SCRUM principles. Therefore, using other solutions means to decide precisely all methods needed for the transversal skills.

