

ANALYTIC TOOLS FOR DESIGN THINKING DEVELOPMENT

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To support sustainable development of production and business, university graduates must be equipped with advanced and effective analytic and digital tools. That means educators need to introduce the tools while training students. As the main focus of any educational program nowadays is on the developed ability to solve problems and come with new effective ways and methods, it is obviously that the process of students' design thinking skills development is becoming vital. The fact, that a business activity is getting more innovative, requires well developed skills of generating new ideas and bringing them to reality. Therefore, a university graduate is being oriented on the development of analytic, convergent and divergent thinking as well as entrepreneur mindset. These days any project includes multidisciplinary environment which significantly influences professional approaches, methods and instruments. For example, experts in production usually deal with technology, equipment and special applications. That means the designing approaches are changing according to the needs of the modern market and along with emerging technologies.

On the other hand, automation and robotization enable creating systems which operate without human making decisions. Moreover, design projects in different industries are provided due to the collaboration of experts from different areas: economists, marketers, engineers, ecologists, etc. Each collaborator should realise how all the structural parts are merged in one system, how they interact and influence the environment to organise the effective and reliable control. For this reason, to understand the process details, causes and effects is crucial. So the skills and tools which help analyse and predict system's operation and its environmental effect have to be received by students along with fundamental professional knowledge.

Advanced analytic approaches are mostly based on modelling. For example, engineers employ CADs to visualise a technical decision and simulate its running under different conditions. When the system cannot be described by an equation, methods of descriptive modelling are used. They apply the Unified Modelling Language (UML), which allows to imagine the behaviour of the system, to predict and explain different level interactions between its participants and components and consider all the effects that could be caused by the design [1].

Introduction of UML models to students' projects could help them to practise innovative analytic methods and tools as well as to develop their creativity and design thinking skills. Use Case Diagram is one of the UML modelling tools. It enables to perform a structural analysis of the system to explain what happens inside and outside it, interactions with the users, objects and environment. UCD diagrams development for a project solution helps students realise their idea or concept, consider the progress, predict the failures and the ways for their improvement. Through UCD diagrams students learn to analyse evidences and forecast different scenarios of situations which develop

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according to the plan and unexpected ones, for instance, a mistaken misuse of the system [1]. While developing their designing skills, students are taught to be focused on the end user and his needs. Moreover, UCD diagrams involve students into a research activity. That develops the skills of considering details and specific conditions, possible interactions, etc. That practice requires development of design thinking skills, abilities to analyse, predict, making decisions. Organising a specific educational environment enables educators to foster student's creativity, appeals to their intelligence, inventiveness, reflection, motivation and responsibility [2].

To illustrate one of the advanced analytic tools, we will consider a UCD diagram (figure 1). It is used to study and present the connections and interactions inside the system as well as between the system and the environment.

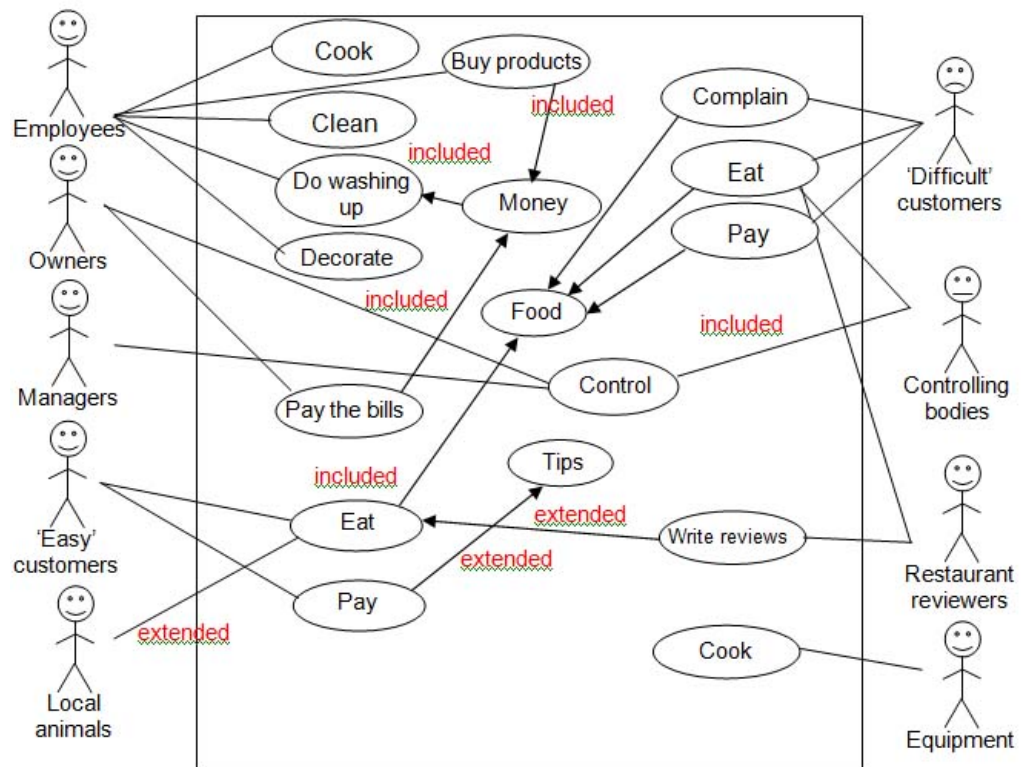


Fig. 1. Use Case Diagram example

The process starts from the focus on the end user's wants and needs. Then all the possible interactions and effects caused by different situations under diverse conditions are carefully analysed. In a Use Case Diagram, the designed system is considered to be a black box with anything inside. The diagram includes four components: the system, the actors (humans, animals, plants, machines, processes that deal with the solution), the services (connected with actors) and the relationships. While developing the model, a student analyses all the actions performed by the system and the relationships inside and outside the system. The number of the actions (cases) is not limited, so the student is free to predict and create all the possible options and then explain the results. Students are encouraged to consider as many options of the system operation as possible. It requires practicing input and output parameters analysis as well as establishing 'forward' and

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'backward' relations. The process of a UCD building can be a group or team work, so students need to apply brainstorming techniques.

Having defined the actors, students consider the relationships between the actors. It is necessary to think about two types of relations, included and extended. Establishment of an included relationship requires a student to realise and think carefully about the initial function of his system. The diagram is considered to be incomplete without all the included relationships' arrows. The extended relationships are optional. To reveal them it is necessary to think of some triggering situations which can cause or require additional functions of the system.

The process of Use Case Diagram building often leads students to a wider view on their design or solution, when they start considering of how the system is going to influence other machines, plants, people, animals and environment. That supports and develops students' reflective skills, encourages them to think about priorities, ask questions and search for answers about values building students' consciousness and fostering their responsibility. Such advanced analytic tools allow students to practice designing algorithm, pass a designing process, improve their creative abilities, and improve skills to invent functional, manageable and safe solutions. They also could develop their professional values, consciousness, responsibility and improve team work skills which are vital for an effective professional activity oriented on the problem solving under fast changing conditions.

References:

1. UML Overview. *Introduction to Engineering: Imagine. Design. Engineer! EdX courses*. URL:<https://courses.edx.org/courses/course-v1:ASUx+FSE100x+217C>.
2. Тітова О.А. Підготовка майбутніх агроінженерів у творчому освітньому середовищі. *Освіта і наука у мінливому світі: проблеми та перспективи розвитку: матеріали міжнар. наук. конф. м. Дніпро, 29-30 бер. 2019 р. Част. I.* / наук. ред. О.Ю.Висоцький. Дніпро: СПД «Охотнік», 2019. С. 30-31.

АУТСОРСИНГ В ДІЯЛЬНОСТІ БІЗНЕС-ОДИНИЦЬ

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Сучасні мінливі ринкові умови, яким притаманний високий рівень конкуренції, потребують використання нових методів в управлінні бізнес-процесами для підвищення ефективності діяльності суб'єктів господарювання.

Аутсорсинг – це один, з альтернативних існуючим, метод управління. Він дозволяє зміцнювати конкурентну позицію бізнес-структур та вирішувати стратегічні завдання за рахунок більш досвідчених, в окремих питаннях, сторін (партнерів), у зв'язку з тим, що постачальником аутсорсингових послуг є організація, яка спеціалізується на відповідному процесі (функції управління).

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