A Gaming and Social Networking Platform for Evolving Energy Markets' Operation and Educating Virtual Energy Communities

H2020 ICT-731767

Initial version of SOCIALENERGY's virtual world functionalities

Deliverable D4.2

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Glossary of Acronyms

Acronym	Definition
ATMSG	Activity Theory-based Model of Serious Games
DR	Demand Response
EQF	European Qualifications Framework
GSRN	Green Social Response Network
HUD	Heads Up Display
LCMS	Learning Content Management System
LOD	Level of Detail
NPC	Non-Player Character
ToU	Time of Use

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Document History

This deliverable includes the first version of SOCIALENERGY virtual world functionalities.

Table 1: Document History Summary

Revision Month	File version	Summary of Changes
28/02/2018	v0.1	Draft ToC circulated to the entire consortium.
05/03/2018	v0.2	The description of the ATMSG framework
13/03/2018	V0.3	Chapter on game functionalities and screenshots
20/03/2018	V0.4	LCMS prototype functionalities description
23/03/2018	V0.5	Executive Summary and Conclusion
27/03/2018	v0.9	ICCS reviews the report and provides comments for quality enhancement before submission.
30/03/2018	v1.0	NRG addresses comments from internal review and the Coordinator submits the final version in ECAS portal.

Executive Summary

This deliverable provides the description of the initial functionalities of the SOCIALENERGY's virtual world as well as some insights about the process of the prototype creation. It provides some insights about the application development including the virtual environment creation, asset design and development process, the description of the interactions that are available to the player in this very first version of the game. Moreover, D4.2 provides an overview of the activities performed for the educational framework development and the initial functionalities of the LCMS.
With this deliverable, the consortium marks a successful reach of the milestone MS4: Release of the initial version of SOCIALENERGY functionalities at M15 and serves as an important step towards the final sprint of the development and integration of the fully functional system at M24.

Chapter 1 presents an introduction to the development of the game mechanics introduced in the SOCIALENERGY game prototype driven by the interactivity and activity

Within Chapter 2 we cover the Activity Theory-based Model of Serious Games (ATMSG) that was applied during the development process introducing the taxonomy of the SOCIALENERGY Game mapping it to the components included in the prototype with respect to actions, tools and goals.

Chapter 3 introduces an overview of the gameplay experience including the description of the virtual environment and what steps have been performed towards its creation. Here, the consortium looks back at the Game Design document delivered in M9 (D4.1) and compares it to the current developments. The functionalities of the game world and the interactions offered at M15 together with the description of the first scenario implemented, namely Time of Use (ToU) Pricing are also covered within this chapter. We conclude Chapter 3 with the analysis of the Game motivation principles and how it contributes to the player's cognitive and affective skill acquisition.

Chapter 4 describes the European Qualifications Framework (EQF) approach that has been adopted and appropriately adapted to fit with SOCIALENERGY project's requirements and objectives. This chapter provides the screenshots and functionalities of the LCMS prototype available at M15 and competences that the user will acquire within the virtual world. Some of those measurable competences will be possible to validate within the Game environment, others are directly connected to the interaction within the real world that are going to be reflected in GSRN. Finally, Chapter 5 concludes the deliverable

1 Introduction

The gameplay experience of the SOCIALENERGY game is built up upon a decision-making process that is based on the experience and information perceived by the player. All the energy-related information is transmitted to the user through visual cues such as graphics and textual sources of information. This can be seen as contextual objects of the game and explicit interfaces. Within the SOCIALENERGY virtual environment, the interactive management of the information can be represented in two categories, namely: a) functional and b) aesthetics.

The functional information gives the user the opportunity to perform certain activities within the simulation that drive the gameplay progression or in a more abstract way lead the player to win the game. In terms of aesthetics, the game defines the context of the environment and serves to render a certain atmosphere, the main purpose of which is to maintain player's engagement and attention on a emotive basis, therefore contributing to the relatedness to the virtual world [1]. In summary, the SOCIALENERGY gameplay is driven by some major concepts such as interactivity and activity.

The first prototype of the SOCIALENERGY game was designed from a player-centred perspective defining base game mechanics and interactive subsystems that are capable of receiving certain input and are able to produce a certain output based on interaction. Carlo Fabricatore defines the gameplay and game mechanics in the following scheme [2]:

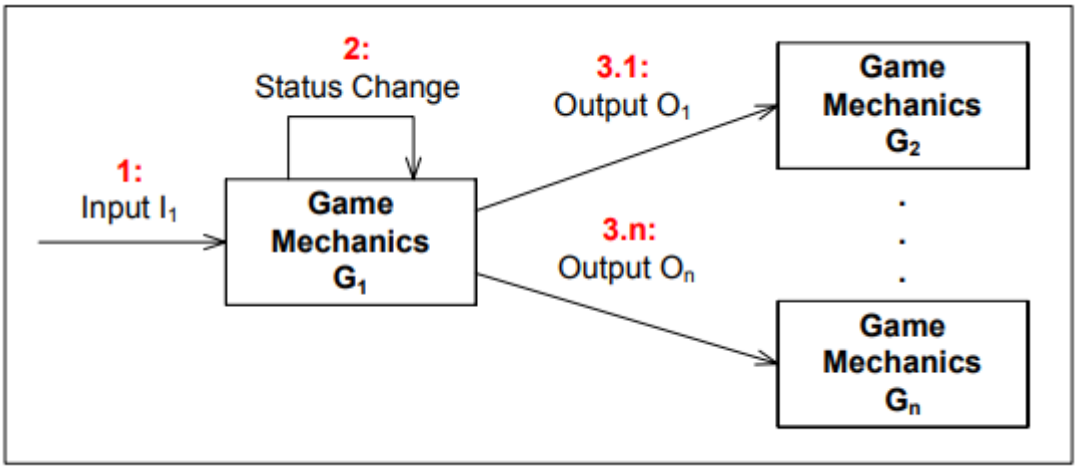

Figure 1: Game mechanics scheme [2]

The output within the virtual environment is then translated into certain changes in the mechanics of the game that in the end change the initial interactions with the rest of the game mechanics. From a user perspective, mechanics of the game allow them to trigger different interactions that will lead to a number of different outcomes.

The SOCIALENERGY game mechanics is characterized by its semantics, which ultimately determines, whether the user will enjoy the game or not. In reality, this is a rather challenging task, since there is no approach that fits all the users, while acceptance and enjoyment of the game is often dictated by the cognitive background of the user. Therefore,

besides applying certain mechanics and semantics to a game, the design of the game considers challenges and rewards for a wider appeal to the user that in the end are still dictated by the mechanics-related activities:

- exposure to the game mechanics and initial learning process;
- application of the mechanics to drive the gameplay as a base interaction;
- applying game mechanics for the gameplay in extra-ordinary situations (e.g. external influences to the gameplay).

The first activity underlines an initial challenge of the mechanics, where the user is required to learn and explore the mechanics of the game to be able to control it. The second one offers an extrinsic challenge, due to the fact that it requires a decision-making process that the player has to apply based on the external conditions (e.g. player is driven to prepare a meal to satisfy avatar's hunger), what interactions to use, when and how to achieve a defined game goal. Here, upon player's decision, the mechanics follow a standard approach of interactions, and no new learning is required. Finally, the third activity imposes a more complex extrinsic challenge, where the user has to apply the mechanics in a given context, where external factors may change the initial outcome. Thus, the player will be challenged to make a decision on what interactions to use, when and how, as well as understand the implication of the external conditions that ultimately affect the mechanics. Here, the users also required to learn how to best exploit the situation to gain the most out of this interaction for their own benefit.

2. ATMSG for SOCIALENERGY virtual world

During the process of prototype development, we have applied the Activity Theory-based Model of Serious Games (ATMSG), which utilizes a framework that helps to understand and form the structure of the educational serious game helping to match the games components with educational goals. Within the ATMSG model, the game is not considered as a separate component, rather perceived as part of something more complex and dynamic that captures gaming activity, learning activity and instructional activity that can easily be reflected within the SOCIALENERGY project's proposition: SOCIALENERGY game, LCMS with educational activity and SOCIALENERGY platform as a whole.

The instructional activity within the SOCIALENERGY game is subdivided in two distinct activities: intrinsic instructions that are activities that take place inside the game only (for example through tips or learning content reminders, help messages), and extrinsic instructions that are performed outside of the game (e.g. within the LCMS, GSRN, at home, etc.). Within the following table, we present a taxonomy used when developing the SOCIALENERGY game in which items are classified with respect to the activity to which they belong:

Gaming Actions		**Gaming Tools**		**Gaming Goals**	
Category	Elements	Category	Elements	Category	Elements
Entity Manipulation	Manage your own house, plan energy consumption, manage resources	Objects	3D space with avatar, Appliances, Modifiers, NPCs, Tokens, Virtual Money	Score	Maximize performance, maximize score
Movement	Move through the house space	Attributes	Position in space, convenience level	Tasks	Complete jobs
Time-related	Advance through the game based on daily cycle	Time	Chronometer	Narrative	n.a
Information	See performance evaluation based on the actions, Watch/read information	Feedback	Achievements, Leader boards, Performance, Points, rewards, Status levels	Competition	Maximize performance and score in comparison to other communities
		Help	Advice and assistance (predefined content from LCMS), Tutorial, Jobs lists	Other goals	Related to learning competence of LCMS
		Chance/Randomness	n.a.		

	Narrative	Story (text)	
	Rules	Game modes (use cases of energy consumption)	
	Segmentation of gameplay	Levels, Timing	
	Goal metrics	Score, Performance record, Money saved, Convenience levels, Achievements	
	Score	Cash score, Composite Metrics, EXPs, Redeemable Points within GSRN	

Table 2: SOCIALENERGY game taxonomy

Following this framework, we further map the existing components of the SOCIALENERGY game prototype to the actions, tools and goals. This reflects that the existing prototype with its initial functionalities can already fulfil the initial requirements of the SOCIALENERGY objectives, while implementing one of the use cases (i.e. Time of Use Pricing):

	Gaming Activity	Learning Activity	Intrinsic instruction activity	Extrinsic instruction activity
Actions	The user manages the avatar within the virtual environment by interacting with the appliances to satisfy its convenience	While performing Jobs, user has to consider the energy price at the time of fulfilling the job therefore learning the trade-off between the price and convenience. Additionally, further insights about different appliance	In all stages, user is able to observe the current and future market price for electricity to make a considerate decision (as part of the prototype). Future developments will consider prior assessments and learning	Outside of the game, learner is able to improve their competences within the LCMS. The overall progress and scores will also be available within GSRN.

		modes are introduced	content feedback	
Tools	Within the gaming actions, the user interacts with different types of appliances that differ in their energy consumption levels depending on the type and mode that is used.	The game uses problem-solving challenges, diagrams and graphed information on the energy price development to learn about pricing and make a considerate decision with respect to task list.	Within the game, we quantitatively assess performance, reward good performance or sanction bad one. We provide the in-game simulation of the scenario	The game offers repetition and link to the outside learning material leading to the LCMS, which provides practice tests, questions and answers, assistance and quizzes.
Goals	The user has to finish all the jobs that are assigned for the day	Achieve minimum cost or maximum efficiency throughout the day	Understand different types of pricing policies and use cases that are presented in the game	The overall behavioural change towards more efficient use of energy in real world environment

Table 3: ATMSG model applied to SOCIALENERGY Game

3 Player and the gameplay experience

3.1. Game Design

The prototype has been developed in Unity[1] with a render resolution of 1280x720 pixel that can be launched on the majority of web browsers supporting HTML5/WebGL on desktop and mobile devices. The virtual world is presented in an isometric camera view. The initial development cycle was focused on the initial environment set-up, asset design and development including sprites, backgrounds, buttons, HUD (Heads Up Display), menu screens, etc. Current virtual world version is presented in Figure 2:

Figure 2: SOCIALENERGY game environment

From the technical perspective, high attention was given to real-time rendering. All the games are expected to render at specific speed (Frames-Per-Second) and from the players perspective, upon pressing a button, users expect the rendering to happen immediately. The art assets, their amount and quality are one of the main influencers on the low frames-per-second. Therefore, an optimization process has been performed to reduce the memory usage of such assets. This has been done by reducing the polycount[2] without giving up too much detail of the silhouette of the model. Furthermore, LOD Model (Level of Detail Models) that used various polygon count of the models with different versions of the game resolution. Texturing process took texture resolution and types of maps (diffuse map, bump map, specular map, alpha map, etc.) into consideration. The animation of the avatar has been performed for this prototype by taking a model that is rigged to a skeleton and animated with

[1] https://unity3d.com. Unity is a cross-platform game engine developed by Unity Technologies, which is primarily used to develop video games and simulations for computers, consoles and mobile devices.
[2] The total number of polygons found in a three-dimensional model.

key frames and looping. One-off animations represent a specific action or a movement of the object or a character.

The current framework that the SOCIALENERGY game is following can be described on a micro-level game layer elaborating on the challenges and obstacles a player must solve, the nature of a player-token – avatar they control and the actions that are possible to perform by the avatar including the results of such interactions. Following the schematic depiction of the framework proposed by Ian D. Beatty [3], the layer can be presented as follows:

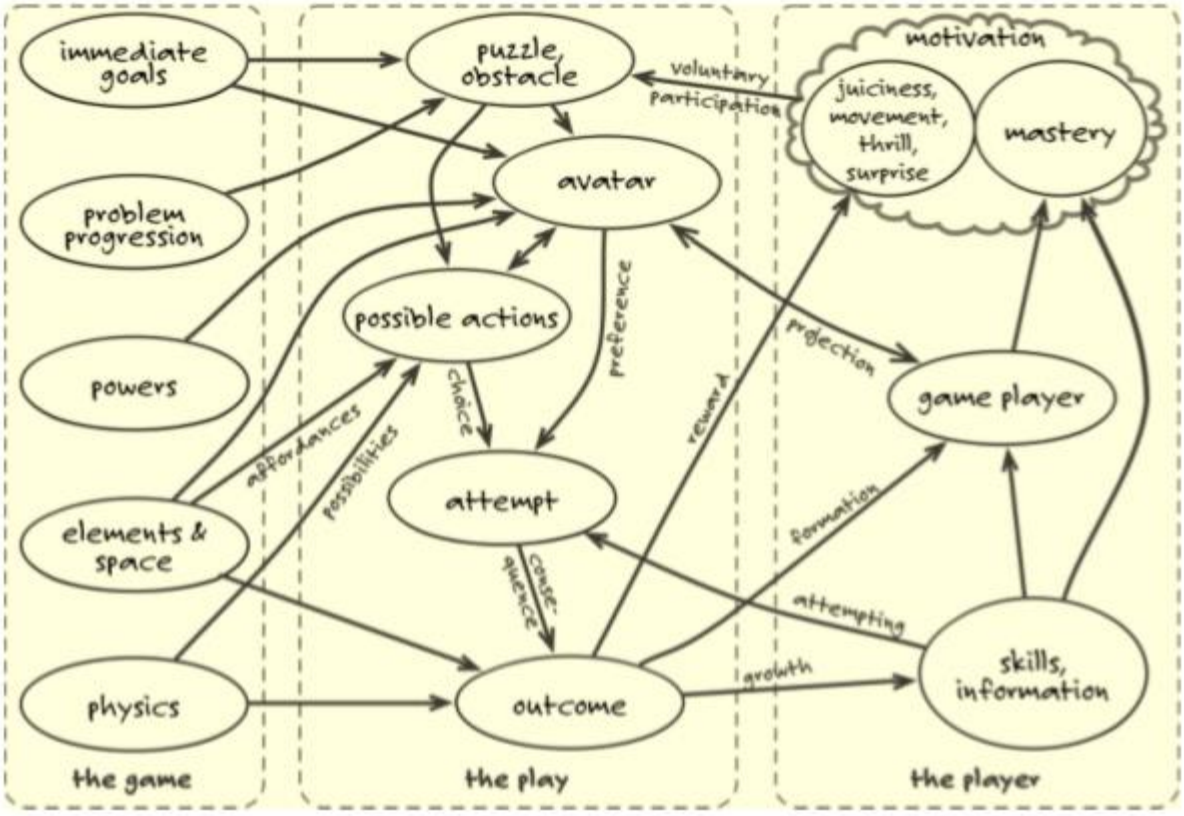

Figure 3: Micro-level game layer framework

Mapping this framework to the present SOCIALENERGY prototype, the virtual game world includes:

Immediate goals and problem progression are in our case combined and serve to achieve minimum energy consumption or the maximum energy efficiency at the same time satisfying avatar convenience levels in a virtual space (left hand side of the framework). As it is depicted in the scheme such goals and their progressions pose certain obstacles to our avatar, where the player has to deal with a trade-off between the two. By interacting through the avatar (middle section of the framework), the player has to perform the possible actions that have certain consequences (on energy consumed, change of avatar's convenience) leading to an outcome that forms skill acquisition, mastery (right hand side of the framework).

3.2. Focus of the gameplay at M15

Players' interactions within the initial version of the SOCIALENERGY virtual world are mediating with a player-token represented by an avatar that depicts an embodiment of the player in the virtual world. Such player-token by design receives inputs from the users and mediates all possible interactions within the proposed virtual world. The initial rules within the SOCIALENERGY game determine the possible actions of the player and are defined as the core gameplay: satisfying the convenience of the avatar in a virtual home by achieving appropriate energy consumption while executing "Jobs". The initial implemented player-token in the demonstrator of the game is depicted in Figure 4:

Figure 4: SOCIALENERGY Avatar

At M15 of the prototype "release", a Time of Use (ToU) Pricing use case was implemented within the game. Within this scenario, the energy consumption prices are dependant on the time slot the user consumes the energy. The user participates in an energy program with Time of Use (ToU) Pricing and has to satisfy the convenience of his/her avatar by achieving the minimum energy consumption or the maximum energy efficiency, while executing several "jobs". Within the game, as depicted in Figure 5, the user is able to click on a dedicated menu in the upper left corner to observe a predefined graph of market prices of the electricity depending on a given time slot. Observing such a graph gives the player the possibility to plan the interactions within the environment accordingly.

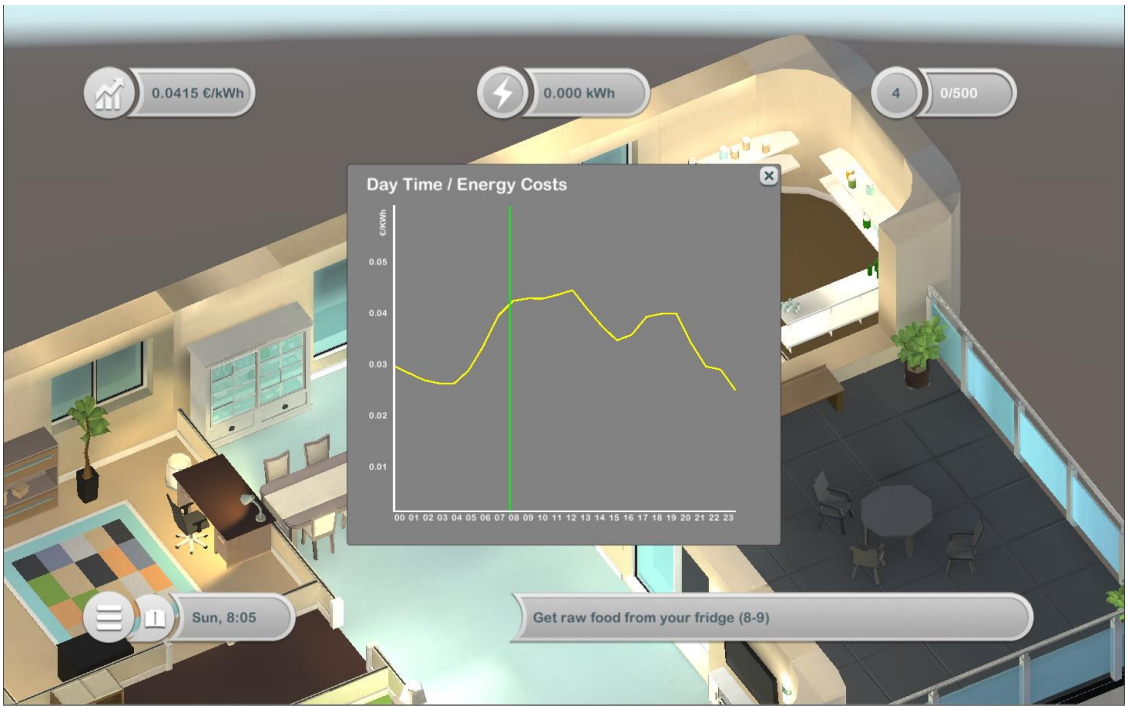

Figure 5: Energy Costs

At the same time, the user has to respect the sub-goals of the game that are proposed to the player in the bottom right corner of the screen listing the Jobs that have to be performed by the avatar. Having this task and information sources at hand, the user is free to execute the job at a time that is most convenient for them in order to maximise the outcome of the Job (monetary-, convenience-, reward- wise). As it can be seen from the Figure 5, the bottom right bar is placed to depict the current job that the player can perform. At the same time, since the goal is to provide the player with the possibility to manage their environment on their own, all the jobs for the day are listed in a dedicated menu (Figure 6).

Figure 6: Game's daily jobs list

The mathematical function that is implemented within the client of the game then calculates the Daily Cost Score as follows:

Daily Cost Score = 100 – { [(Maximum Costs - Daily User Costs) / (Maximum Costs - Minimum Costs)] * 100 }

Respectively, the daily convenience then is calculated by:

Daily Convenience Score = (100 * Daily User Convenience) / Daily Maximum Convenience

As described in the initial Game Design document (D4.1 delivered in Month 9), the user navigates through the environment by a mouse click. By clicking on an interactive object, the user is able to perform one of the desired jobs. For the prototype development, a number of graphical assets have been created to form an attractive environment.

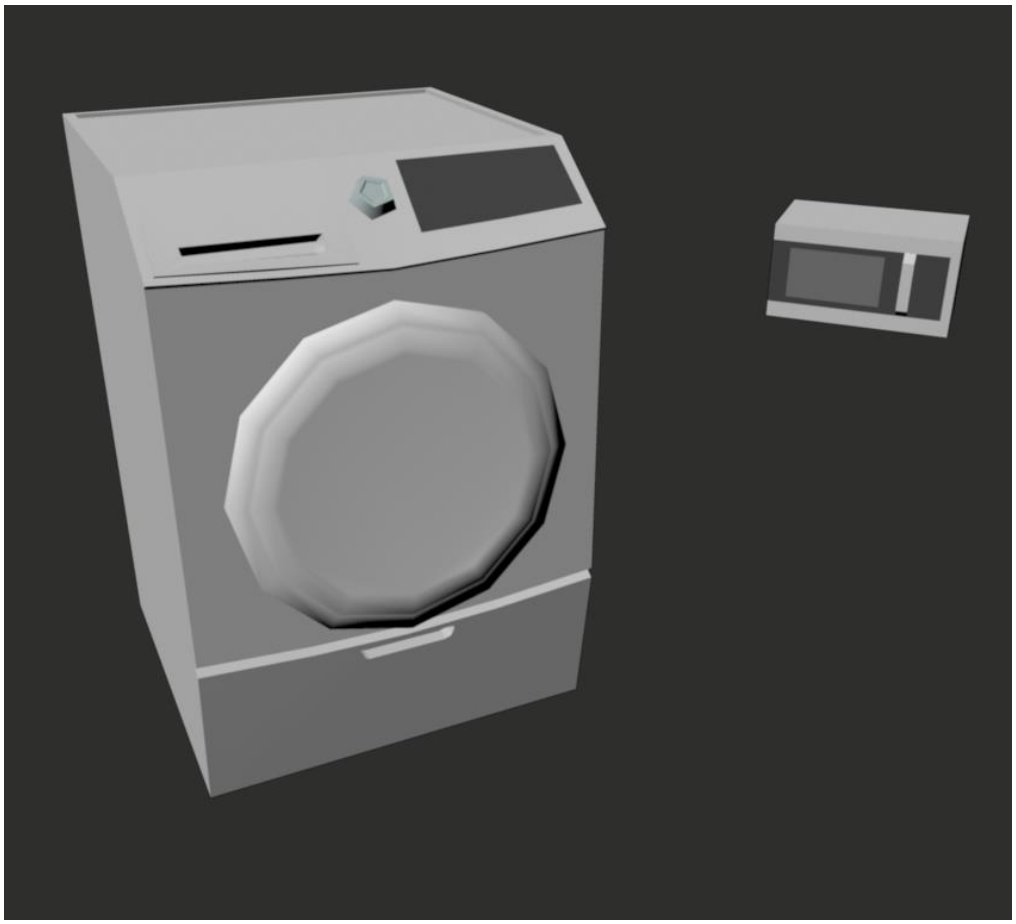

Figure 7: Examples of electric appliance assets

A set of initially defined appliances were defined in D4.1 and modelled respectively to populate the environment. At the initial stage, we do not differentiate between different types of objects, but the future releases would not have all the decorate objects, since those would drive the gameplay and could be unlocked upon reaching certain levels.

Should the user decide to take on one of the jobs, clicking the object would reveal anotherr menu revealing different types of modes for a given appliance:

Figure 8: Appliance mode selection menu

Depending on the job, it might have specific requirement for the time it is supposed to be performed. This also affects the convenience level that the player might reach at the end of the day. A separate graph describing the job and indicating the convenience levels are provided in a pop-up window for this particular job:

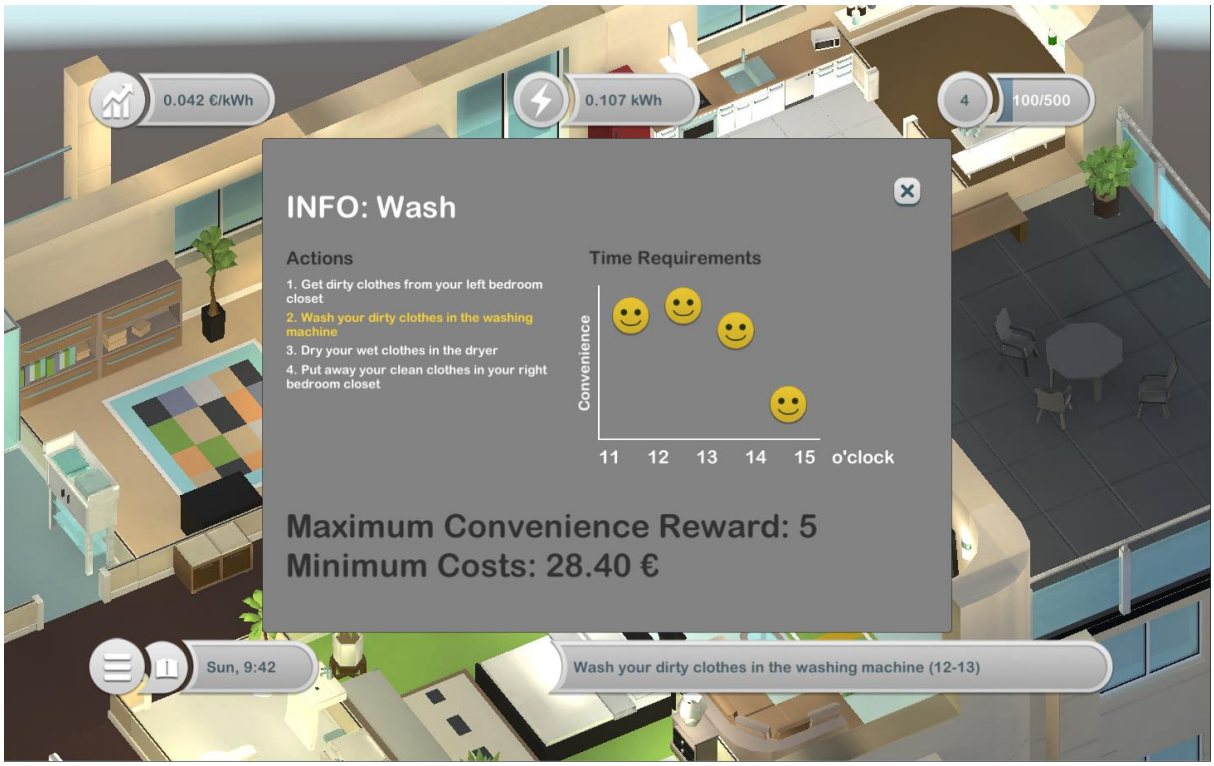

Figure 9: Convenience levels for the activity

At the end of the day, the user gets the results of the gaming day activities. Specifically, the resulting screen shows the number of finished jobs that the user managed to finish throughout the day, the daily consumption of energy, daily costs for the consumed energy, daily convenience and its score together with a total score:

Figure 10: Game result screens

Obviously, some of the tasks are time based and are supposed to be performed within a given time frame. If the user fails to finish the task as defined, a failed task context menu pops up to indicate that with this action, the user did not save any money or earned any experience.

Figure 11: Failed task result screen

3.3. SOCIALENERGY motivation and learning process

Following the taxonomy of the learning outcomes proposed by Wouters et al. [4], serious games can affect cognitive, motor, affective and communicative skills of the learner (Figure 12). Considering the SOCIALENERGY game goals and overall project's objectives, we will focus on Cognitive and Affective first:

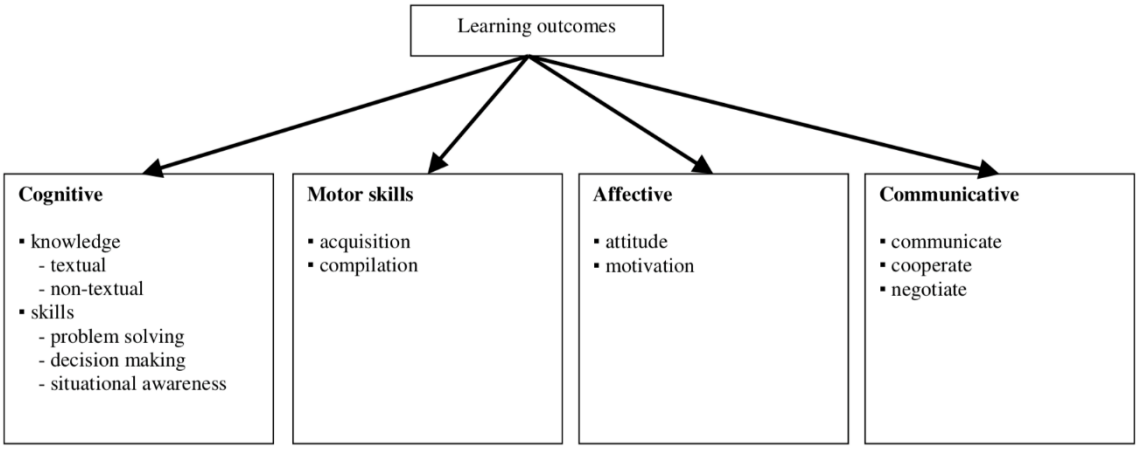

Figure 12: Learning outcomes of serious games

Considering the Cognitive learning outcomes of the SOCIALENERGY virtual world, we can separate them into knowledge and cognitive skills. Knowledge pertains text-oriented and non-text- oriented knowledge (for example in form of a visual presentation). We further

differentiate such knowledge between declarative (this is a concrete factual awareness) and procedural (knowledge about certain activities or how to fulfill the task).

With respect to cognitive skills, some more complicated cognitive processes can be envisioned. For example, in problem solving, the user is expected to apply newly acquired knowledge to be able to solve consecutive problem. In reality, we can also observe situations where learners have to make timely decisions and apply their problem-solving skills under time pressure. Thus, the decision-making process would in addition require situational awareness of the person, entailing the capacity of the user to understand and comprehend the information and its context in a given situation and how will it evolve in the future [5].

The same rationale holds with respect to *affective learning outcomes.* One can recognize two distinct subtypes, namely: the change in the attitude of the learner and motivation. Attitudes can be described as internal states of a learner that could possibly affect their choices or actions [6]. This is directly related to SOCIALENERGY game objectives, not only with respect to changing learning attitudes, but more importantly a change to the behavior that is inherent to the user in a daily life. Motivation on the other hand, is the state that has the ability to start and pursue with the learning process. Motivation indicates learner's disposition to pay attention to energy related learning material and therefore spend certain amount of cognitive resources to process this material.

A cognitive theory indicates that some new serious game players can become overwhelmed with the amount of material and information that is presented and supposed to be consumed without initial support and guidance. For this reason, it is advised to limit the amount of learning material within a given "job" in the virtual environment respecting cognitive capacity of an individual user. An interactive guidance to the whole gaming process is part of the final stages of the virtual environment. The first prototype respects cognitive capacity of the user offering initial overview of only relevant information about the appliances and their modes and a more thorough content can be consumed within LCMS subsystem.

Apart from theoretical approaches that the SOCIALENERGY game is following, an emphasis is given to certain game characteristics that provide enough motivation to the players to pursue the gameplay. Those are so-called psychological mechanisms that highlight motivation processes as also was thoroughly reviewed in a study of Ryan et. al [7]. The main findings, supported by the self-determination theory, revealed that perceived autonomy (i.e., being autonomous in own decisions and uncontrolled to fulfill the job) and competence (i.e., being challenged and the feeling of fulfillment of the objective) are the major drivers that affect the motivation in the game. Within SOCIALENERGY game prototype, the users are free to choose the activity they would like to perform during the day but is driven by the willingness to earn points and be able to unlock further assets for their environment. Therefore, the game supports the self-determination theory offering the list of all the possible jobs that can be fulfilled during the day and the user is free to autonomously decide which to finish first, of course trying to respect the overall rules of the game.

4. SOCIALENERGY's LCMS functionalities

In the earlier stage of project implementation, SU-NIS researched and adopted the competence-based learning approach, where the outcomes of the education pathway are assessed via a competence-based system (i.e. LCMS). After careful consideration of all aspects of existing competence frameworks in the field of energy efficiency, energy management, energy savings and energy efficiency behavioral change, it has been decided to develop a new competence framework, which corresponds to SOCIALENERGY project objectives and target groups.

For the design and development of the new competence framework, the European Qualifications Framework (EQF) approach has been adopted and appropriately adapted to fit with SOCIALENERGY project's requirements and objectives. Its hierarchical structure with reference levels defined in terms of learning outcomes: knowledge, skills and autonomy-responsibility match the project purposes. The SOCIALENERGY competence framework consists of 7 base competences, each one divided into three levels of proficiency: basic (level 1 of proficiency), intermediate (level 2 of proficiency), and expert (level 3 of proficiency).

	Knowledge	**Skills**	**Responsibility and autonomy**
Competence 1	**Energy efficient electric appliances**		
Level 1	Knows the main types of mostly used appliances, found in the market	Can operate main types of mostly used appliances, presented in the market	Applies autonomously and with responsibility knowledge and skills for the main types of mostly used appliances, found in the market
Level 2	Knows the usage of energy per electric appliance	Uses safely electrical equipment and power grid	Makes autonomously and with responsibility a safe use of electrical equipment and power grid
Level 3	Knows the benefits of more energy efficient appliances	Understands and performs activities leading to energy savings	Develops habits for responsible and autonomous efficient energy consumption
Competence 2	**EU energy labelling**		
Level 1	Has some initial information that such labels are used	Can find if some labelling information is included for a given appliance	Has some understanding that this issue is important
Level 2	Knows the EU energy labelling (the rationale of energy labelling of electric devices and houses/buildings)	Recognises the EU energy labels	Makes informed judgement about the energy efficiency of an appliance on the base of its EU label

Level 3	Can assign labels to appliances even if such information is not provided	Can apply knowledge about energy labels in various situations	Can inform others about any information related to energy labelling
Competence 3	**Energy metrics**		
	Knows various energy metrics	Recognises and decodes various energy metrics	Applies autonomously energy metrics knowledge and skills to take energy efficient decisions
Level 1	Basic	Basic	
Level 2	For energy efficiency	For energy efficiency	For energy efficiency
Level 3	For DR	For DR Decodes the important data and information included in documented energy feedback messages	For DR
Competence 4	**Demand Response (DR)**		
Level 1	Knows what is DR	Avoids simultaneous usage of appliances Reduces electricity consumption at the house level and on per electric appliance level (i.e. load curtailment / shedding)	Takes responsible decisions for participation in DR
Level 2	Knows how to shift jobs from peak hours to non-peak hours (i.e. load shifting)	Shifts jobs from peak hours to non-peak hours (i.e. load shifting)	Takes responsible decisions about reducing electricity consumption
Level 3	Knows the consequences of participation in DR	Reacts appropriately to DR messages Possesses the trade-off skills to balance between energy (bill) cost and discomfort (i.e. lower electricity bill incurs some acceptable level of discomfort).	Possesses knowledge and skills to participate autonomously in DR events/activities
Competence 5	**Smart Grid**		
Level 1	Basic concept of smart grid	Identifies types of electricity market, including smart grid types	Takes responsible actions for selection and joining particular

	How does the electricity market work?		type of electricity market
Level 2	Knows what energy prosumer is Knows the basics of EU liberalised electricity markets	Makes informed choices in the context of the EU liberalised electricity markets	Acts as a responsible energy consumer / prosumer Makes responsible autonomous choices for participation of the EU liberalised electricity market
Level 3	Knows the environmental impact of energy efficiency Knows how to identify the products minimum description related to kWh/CO2 information	Uses the products minimum description related to kWh/CO2 information	Assess autonomously the environmental impact of energy efficiency
Competence 6	**Types of pricing schemes and energy programs**		
Level 1	Knows major energy programs: Traditional flat electricity tariff Inclining Block Rates (IBR) pricing	Can use the following pricing schemes: Traditional flat electricity tariff Inclining Block Rates (IBR) pricing	In a given context, makes responsible and autonomous choice between the following pricing schemes: Traditional flat electricity tariff Inclining Block Rates (IBR) pricing
Level 2	Knows major energy programs: Time-of-Use (ToU) electricity pricing Real-Time Pricing (RTP)	Can use the following pricing schemes: Time-of-Use (ToU) electricity pricing Real-Time Pricing (RTP)	In a given context, makes responsible and autonomous choice between the following pricing schemes: Time-of-Use (ToU) electricity pricing Real-Time Pricing (RTP)
Level 3	Knows major energy programs: Personalized RTP Community RTP	Can use the following pricing schemes: Personalized RTP Community RTP	In a given context, makes responsible and autonomous choice between the following pricing schemes: Personalized RTP Community RTP
Competence 7	**Energy communities**		

Level 1	Knows what Energy Communities are	Has skills to participate in energy communities	Makes responsible and autonomous decisions about participation in energy communities
Level 2	Know how to form an energy community	Has skills to form energy communities	Makes responsible and autonomous decisions to form an energy community
Level 3	Know how to manage an energy community	Has skills to manage energy communities	Makes responsible and autonomous decisions in managing energy communities

Table 4: LCMS Levels of proficiency

All listed competences are related to courses (set of learning resources and activities) and fully integrated within LCMS. LCMS provides competence based education and training grounded on the proposed SOCIALENERGY competence framework. For each competence, different learning courses are provided for respective users through LCMS.

Figure 13: Competencies' settings in Moodle 3.2.

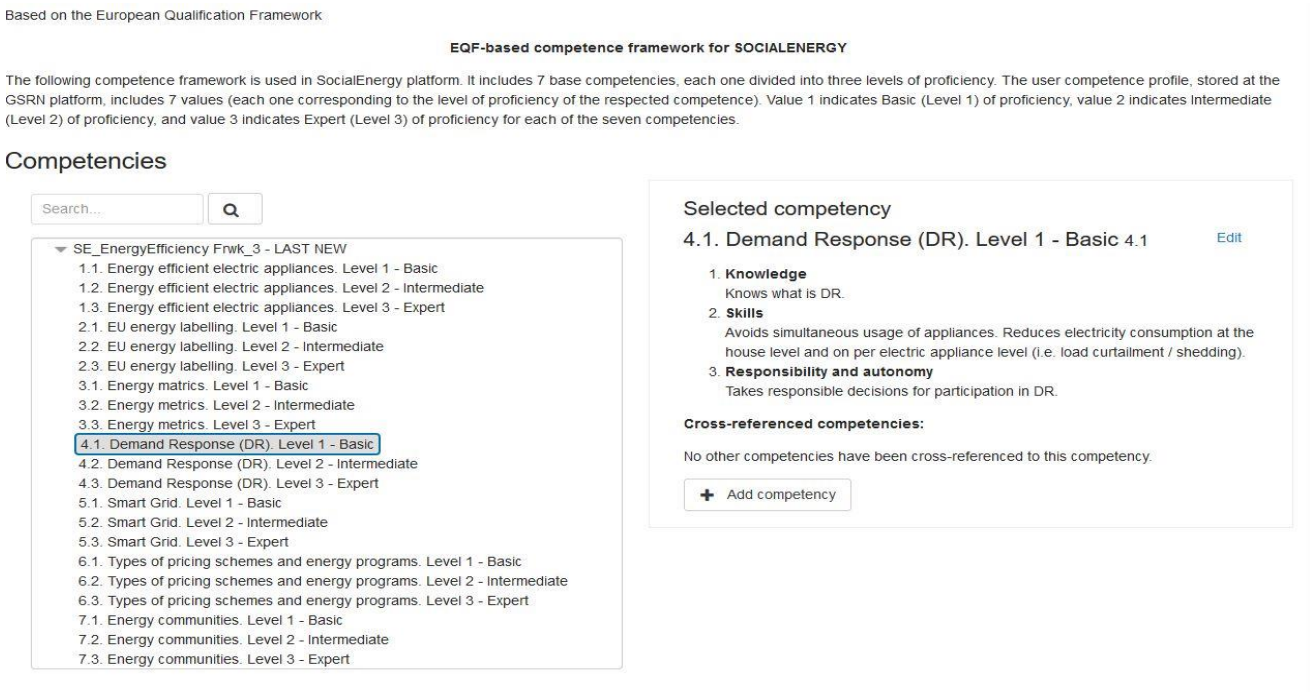

Figure 14. EQF-based competence framework for SOCIALENERGY

All courses include different types of learning activities/resources related to the three main aspects of the competences framework: knowledge, skills and responsibility and autonomy. These major types of learning assets are:

- Readings pdf - Written material intended to be read, that present educational content primarily through text, but also contain appropriate graphics, diagrams, illustrations
- Presentations – summary of reading materials
- Videos - represent a short portion of educational content with examples and information on how to complete a certain task
- Lessons – including practical information
- Quiz – a set of questions and/or problems used as a means of evaluating the abilities, attitudes, skills

In the following figure an indicative course is presented, which covers Competence 1.3. Energy efficient electric appliances. Level 3 – Expert through a set of learning and resources.

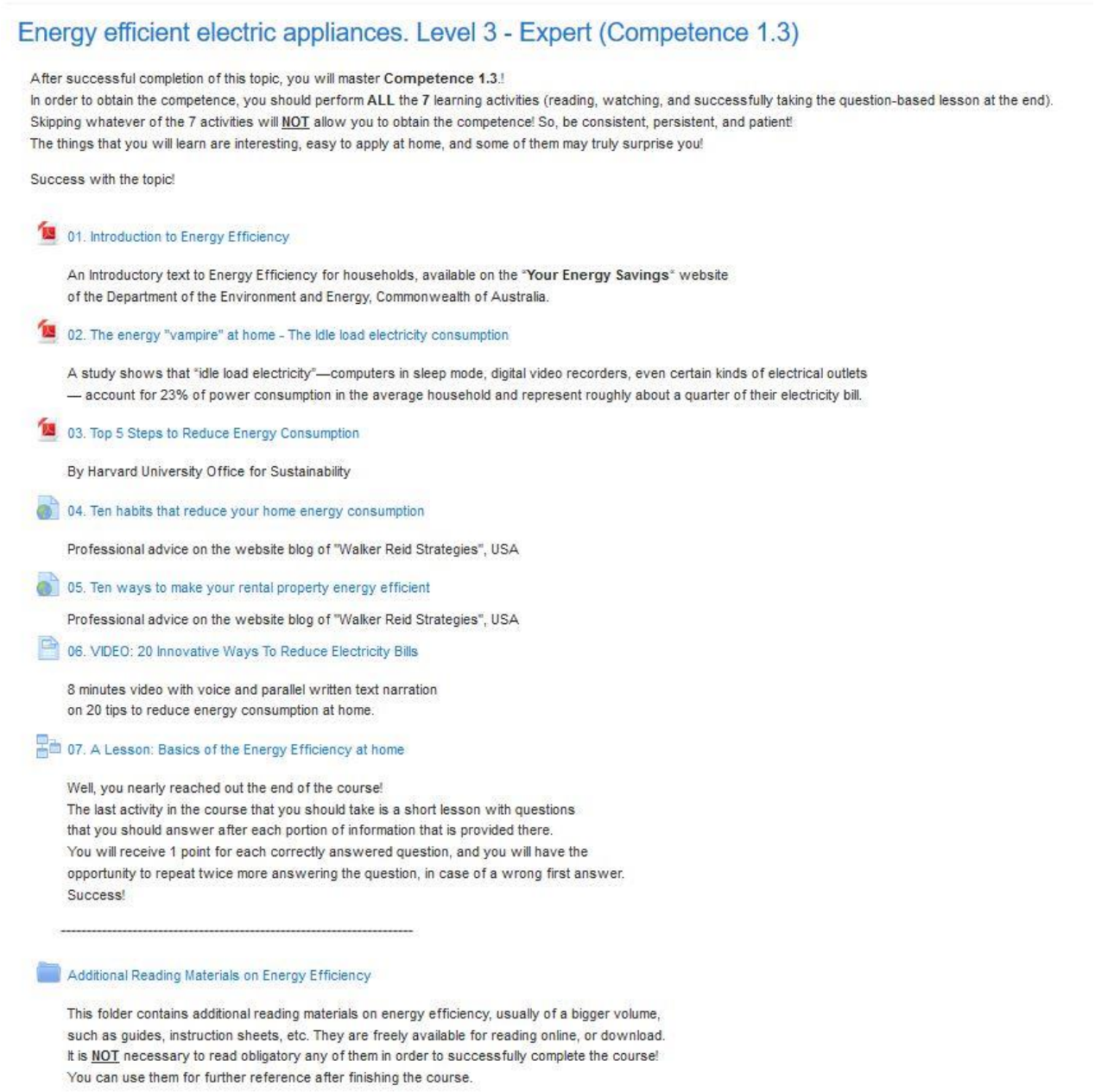

Figure 15. Course covering Competence 1.3. Energy efficient electric appliances. Level 3 – Expert

A particular course is linked to a competence from the EQF-based competence framework for SOCIALENERGY.

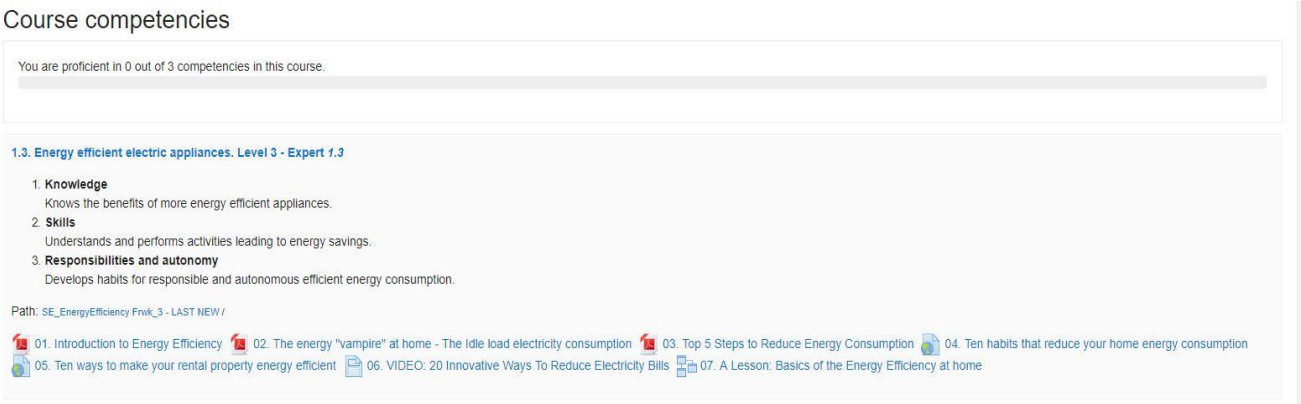

Figure 16 Linkage between a course and Competence 1.3. Energy efficient electric appliances. Level 3 – Expert

The identification of missing competences/gaps in competences is taking place in GSRN. All users fill in an initial questionnaire, which defines the set of missing competences and combine them in an Individual Learning Plan (ILP). Thus, each user will be informed about the new competences in which shall be educated in LCMS (for more technical details, please see D3.1).

Users in LCMS are able to:

- Search for users – retrieval of users via criteria to match
- See competencies – retrieval of list of competencies
- See a user's ILP
- List of learning plan's competencies
- List of courses using a competency
- List of badges awarded to a user
- List of user's course final grades
- List of grade items for users in a course

LCMS will report to GSRN all this information and more through a well-designed API for integration with the core GSRN S/W platform. More technical details will be provided in D5.2 (M18).

Learning content will be available within the game, which will enhance the learning process. It will be presented as predefined and condensed content such as hints, useful information, presented by a virtual coach.

5. Conclusions

Concluding the D4.2, the consortium provides evidences of reaching MS4: Release of the initial version of SOCIALENERGY functionalities at M15 having the first iteration of already playable game with one of the defined use cases (i.e. Time of Use) and some of the main interaction processes within the virtual environment. Graphical assets were developed in order to allow the outcomes of the WP4 to be appropriately disseminated to a wider public providing a visual identity of the game.

Furthermore, the SOCIALENERGY competence framework was designed and introduced within the LCMS. Initial version of the system is described and presented reflecting the latest developments together with the learning material that is already present within the system. Further works include further improvements and definition of the reduced content that will be integrated within the game to offer a complete and seamless experience of interacting with the system as a whole.

The afore-mentioned achievements and work progress give pace to the start of core S/W integration work, which that has already begun. Step-wise, the actual work schedule plan is the following:

- The core S/W integration work will take place in the context of technical Work Package 5. Partners will work closely and collaboratively on the APIs for the interaction among the various subsystems during the upcoming 3 months.
- S/W implementation work is continuing by enhancing the existing functionalities and integrating the residual use cases in the GAME and even more learning material and functionalities within LCMS.
- Pilot setup and experimentation plan is under construction in order to start pilot testing activities once a stable SOCIALENERGY S/W prototype version is ready for DEMO.

The goal until the end of the second reporting period is to demonstrate the first stable version of SOCIALENERGY system during the 2nd review meeting in front of potential customers, too in Athens in September 2018.

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