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Recycling Learning Resources with AgileAMK Model

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Abstract

Ten universities of applied sciences (UASs) in Finland have developed an **AgileAMK model** in an ESF funded project *Uutta avointa energiaa* (New open energy). The model was created to help higher educational institutions to respond to the changing educational needs of companies, organizations and the labour market in a flexible and cost-effective way.

The Finnish abbreviation AMK in the AgileAMK stands for UAS – university of applied sciences. The AgileAMK model has been applied to create compact modules for extension studies and short educational programs out of large existing degree program content modules. The main idea is to modify existing educational content quickly and flexibly, in an agile manner, for new purposes. During the project the participating Finnish UASs have been working closely with representatives of labour market in modifying the educational content.

The AgileAMK model is loosely based on Scrum and Kanban agile software development models. The AgileAMK model is being tested by implementing MOOC-type pilot courses running on the DIGMA.FI learning platform. The themes of the pilot courses are "Nearly-zero energy building" and "Sustainable energy solutions", both related to the EU Commission Recommendation on nearly-zero energy building (EUR-Lex, 2016). Pilot courses are being offered in Finnish and in Swedish. The AgileAMK model has been and will further be modified based on feedback from the pilot course students.

Quality assurance cards for production, MOOC pedagogy, content, as well as usability and accessibility have been created in the project. The cards can be applied at various stages of the AgileAMK model.

Keywords: MOOC, agile, higher education, online course, e-Learning, online learning, model, ESF, Finland, energy, nearly-zero energy

1. Need for an agile educational production model

The creation of a new, agile production model of MOOC-type courses initiated from quite a special need: the demand of developing renewable environmentally friendly forms of energy in Finland, and mastering the requirements of the nearly-zero energy building according to the EU recommendations. According to the EU Commission Recommendation 2016/1318, by 2020 all new buildings inside EU should be nearly zero-energy buildings (EUR-Lex, 2016). It was evident that existing actors and companies in these areas of technology should be further educated so that their competency will meet the new technological requirements.

The private enterprises do not necessarily prefer their employees entering long degree programs at universities. Instead, short programs of extension studies which can be done online while working, and which are concise and specifically designed for professionals would be easier to approach. Another aspect was that universities of applied sciences in Finland had both the technological competency and the learning assets to meet the nearly-zero energy challenge, but the learning content was mainly designed for four-year degree programs.

In this context ten universities of applied sciences (UASs) in Finland found it necessary to start creating MOOC-type concise learning modules in a more rapid and flexible way. They applied for national European Union's Social (ESF) funding, firstly, to create an agile method of course creation, and secondly, to pilot the model with courses on renewable energy and nearly-zero energy technologies.

The funding was granted nationally in the Programme for Sustainable Growth and Jobs 2014–2020: Education, skills and lifelong learning (ESF), and the **Uutta avointa energiaa (New open energy)** project was launched in August 2015. The project will continue until July 2018. The Uutta avointa energiaa project website can be found at <http://uusiavoinenergia.fi>.

By September 2017 the project has developed an **AgileAMK model (2017)**. The model was created to help higher educational institutions to respond to the changing educational needs of companies, organizations and the labour market rapidly in a flexible and cost-effective way. The universities of applied sciences involved: Tampere UAS (the lead partner), Oulu UAS, Lahti UAS, Centria UAS, Novia UAS, Arcada UAS, Haaga-Helia UAS, Kajaani UAS, Turku UAS, Satakunta UAS.

Two of the participating universities are Swedish speaking. The model it is being currently applied and tested in a few MOOC-type online courses, both in Finnish and in Swedish. The pilot courses are available for anyone on the DIGMA.FI learning platform.

2. Background for agile production models

Agile development model was initially a set of methods used in software production projects. The Agile model is described officially in the *Manifesto for Agile Software Development* (Manifesto, 2001). Since the declaration of the Manifesto, the notion has been expanding to other areas, and currently any project that values the 12 *Principles behind the Agile Manifesto* (Agile principles, 2001) can be considered agile. According to the Manifesto, preference should be given to:

- **“Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan“.

These principles apply quite well in the situation when universities aim to respond to the rapidly changing educational needs of working life in a flexible and cost-effective way. Considering that we are developing online learning modules, we could slightly modify the second item. We give preference to **working educational learning modules** over comprehensive documentation. The name of the model **AgileAMK** refers to an agile university of applied sciences. In Finnish the abbreviation AMK denotes UAS, University of Applied Sciences.

The starting points for the AgileAMK model are:

- Scrum, providing a reference framework for solving complex problems and product development, without taking into account the implementation methods or techniques (Scrum, 2017).
- Kanban, which is a production timing system that helps you determine what is to be produced, when, and how much (Kanban, 2017).

AgileAMK model applies Scrum's daily meetings and other practices. On the other hand, AgileAMK model is influenced by Kanban method in the visualization of work steps.

3. AgileAMK Model in a nutshell

The AgileAMK model in a nutshell is presented in figure 1 below. In the **Study module backlog** phase the team members describe the entities of the required educational module. This phase shows what will ultimately be delivered to the customer. It is essential that the product owner, client, stakeholders and the study module developers are involved in this phase.

The study module backlog makes the project goals and progress visible to both the development team and the customer. When planning the entities of the backlog, the customer's wishes should be carefully taken into consideration. Planning the entities of the study module backlog also helps organizing the project team for the next sprint. Finally, one or a few of the entities (work blocks) of the backlog will be forwarded to the next phase.



Figure 1: AgileAMK model in a nutshell

Sprint is a one to four week time slot, a kind of mini project. One of the entities is processed during a sprint. On the other hand, more than one entity can be processed simultaneously in case sufficient work force is available. Several sprints can be running simultaneously in case designers and team members can be allocated into the development teams. At the beginning, a **sprint's planning meeting** is held, where the goals and tasks of the sprint are defined and a common understanding of the requirements is achieved.

The goals of the sprint make a **sprint backlog**, which is divided into concrete tasks, which make a **sprint task list**. The task list becomes a sprint development timeline as soon as deadlines and actors are allocated for each task. The development team also evaluates and allocates the time spent on each task. Large tasks should be minimized so that they can be performed in one or two days. Tasks and their number vary according to the target of the sprint.

The AgileAMK model takes no position on the tools that can be used while processing the backlogs or when running the sprints. In an ideal situation short (30 min) meetings are held on a daily basis. The tasks can be reallocated in the daily meetings to different members of the team in case a task gets stuck for one reason or another. New tasks are allocated to the team members from the sprint backlog, until all the tasks are finished.

Finally the development team runs a **sprint review**, where the team members present the concrete outcome of the sprint, and the team concludes and closes the sprint. Before starting the next sprint, the team runs a **sprint retrospective**. It is a post-review reflecting what was successful, and what could be improved in future from the perspective of the AgileAMK process. The product owner or the client can theoretically be engaged in any of the phases of the model, but realistically speaking they are usually present only in the sprint review, and sometimes in the sprint retrospective phases. In an ideal situation also the key stakeholders could be involved in these phases.

4. Quality assurance cards

To ensure the high quality of the process and the outcome, four quality cards and related assessment questions were designed. Quality cards functioned systematically throughout the production process, supporting quality assessment in the production teams. The aim is that the content and implementation of the courses produced using the AgileAMK model are technically high and pedagogically compliant with modern teaching methods. Quality assurance cards have been created by Irja Leppisaari (Centria UAS), Päivi Aarreniemi-Jokipelto (Haaga-Helia UAS), Päivi Rajaorko (Haaga-Helia UAS), Pekka Tervonen (Kajaani UAS) and Miia Törmänen (Tampere UAS).

Quality cards are based on existing MOOC quality criteria (Rosewell, 2014; Herrington et al., 2010) and, on the other hand, on the Finnish quality assurance criteria for online learning (Opetushallitus, 2006). The design of quality cards was created to take into account the special challenges of MOOC-type courses, as the MOOCs are characterized by openness and large numbers of participants. Key themes in quality cards are **pedagogy, usability** including **accessibility, content and production**. Each of the themes includes the quality criteria, a set of control questions and an evaluation scale. The cards can be used as checklists for designing the MOOC courses and also in the implementation and evaluation phases.

Quality criteria for pedagogy

1. Learning objectives have been defined in relation to demands of working life.
2. Learning objectives, content, methods of work and assessment constitute an entity, which supports learning.
3. Working methods support community-based knowledge building and knowledge sharing.
4. The learner is able to track the progress of his learning process.
5. Instruction in its various forms has been designed as part of the learning process.
6. Evaluation is continuous and versatile.

Quality Criteria for usability and accessibility

1. The learning environment is:
 - a. Easy to use
 - b. Easy to learn
 - c. Functionally reliable
 - d. Secure.
2. The learning environment adheres to accessibility recommendations
3. Content is provided in various forms, for instance, images, audio, video, and text.
4. Requirements for different devices have been taken into account.

A screenshot of the usability and accessibility quality card is shown below in figure 2.

Määrittelyvaihe: MOOCin kehitysjono

<i>Laatukriteeri</i>	<i>Arviointikysymys</i>	<i>Arviointiasteikko</i>	<i>Ohje</i>
1. Oppimisolustan, tekninen käytettävyys	I. Onko oppimisolusta helppokäyttöinen?	<input type="radio"/> Ei <input type="radio"/> Osittain <input type="radio"/> Enimmäkseen <input type="radio"/> Kyllä	Mitkä ovat oppimisolustan toiminnalliset vaatimukset? Mitkä ovat sisällön standardivaatimukset (mm. kuva, ääni, video ja teksti)? Mitkä ovat laite- ja sovellusvaatimukset?
	II. Onko oppimisolusta helposti opittava?	<input type="radio"/> Ei <input type="radio"/> Osittain <input type="radio"/> Enimmäkseen <input type="radio"/> Kyllä	
	III. Onko oppimisolusta toimintavarma?	<input type="radio"/> Ei <input type="radio"/> Osittain <input type="radio"/> Enimmäkseen <input type="radio"/> Kyllä	

Figure 2: An excerpt of the quality card for usability and accessibility. The criterion is on the left. The control questions are in the second column. The evaluation scale of quality comes in the third column, and the instructions in the fourth.

Quality criteria for content

1. The needs of the users are taken into account in the content.
2. Content is designed to meet the learning objectives.
3. The material is:
 - A. Reliable and up-to-date
 - B. Clear and comprehensible
 - C. Accessible
4. Sources are of high quality and they are expressed clearly.
5. Maintenance and upgrades of the content are provided.

Quality criteria for production

1. Production is planned.
2. Target groups are defined.
3. Copyrights have been agreed.
4. The technical and pedagogical support of the content providers has been ensured.
5. Quality criteria have been taken into account at various stages of production.
6. Continuous feedback is gathered from students and production teams, and it is used immediately.

The AgileAMK production teams were familiarized with the use of the quality cards and the evaluation criteria in online sessions. The production process of online courses is intricate, and it takes place besides the other teaching duties of the teachers, so using the quality cards for evaluating the material and production of courses has been quite limited. For this reason, a member from the quality team, specialized in using the quality cards, has been attending the development team meetings. Anyway, introducing the development team to common quality criteria before starting the AgileAMK process will clearly improve the quality and speed up production. The iterative process under the AgileAMK model involves essentially the fact that we learn from our mistakes and will not repeat them.

The AgileAMK quality cards (Leppisaari & Rajaorko et al., 2016) are currently available in Finnish, but it is possible that they will be translated into English by 2018.

5. AgileAMK Model Step-by-Step

In the beginning of the *New Open Energy* project the development teams applied the AgileAMK model on the basis described above in the chapter **AgileAMK model in a nutshell**. Initially the intention was to keep the model as simple as possible, but unfortunately the model lacked some concrete details, so an additional graphical presentation was designed, as we can see in figure 3. According to the feedback from the development teams, it was necessary to add some kind of a feasibility study into the model.