

Simplicity and design as key success factors of the OER repository LeMill

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Summary

This article focuses on the OER (Open Educational Resources) repository LeMill, which is a web community for finding, authoring and sharing learning resources, provided as a free and open service to everyone at <http://lemill.net>.

Unlike many OER repositories that have authoritative content, LeMill relies on grassroots activity to get new content. All resources are created and edited by volunteer teachers and content authors. The success of LeMill shows that a grassroots OER repository can grow to be so valuable that it attracts new members and new resources by itself. The technology behind the community is not spectacularly ground-breaking, but the extensive design and simplicity are what make LeMill different from most other OER repositories.

As a premise, this article claims that it is the emergence of simple enough tools that allow fundamental changes in people's behaviour. Based on the experiences of developing LeMill, the most critical design recommendation for an OER repository is to involve actual teachers throughout the development project. Teacher feedback must be accepted at all times, although it should not be taken at face value.

As a closing of this paper, we describe an innovative "trinary economy" business model for OER repositories which involves teachers, educational administration and text book publishers.

Keywords: collaborative environments, OER, Pedagogy, teachers, simplicity, LeMill, trinary economy, Open Educational Resources

1 Simple tools alter the world

The rapid growth of blogging in the last few years can be attributed to the emergence of simple tools for the purpose. It has been quite possible to keep a weblog or web diary already in the middle of the 90s, yet none did. When specific blogging tools, such as Wordpress, emerged, the task of creating and updating a weblog became simple enough that anyone could do it without technical expertise or training. And the same applies to all technology: getting the tools simple, accessible and affordable enough makes them viable in mass markets. What all these tools have in common is good design, high focus on one single task, and ease of use. As Steve Jobs has said, the initial simplicity and crudeness of a new technology (eg. dictaphone) is followed by 'featurism', which only appeals to a small minority (eg. Zune audio player), and this in turn is followed by a new wave of simplicity, where the essence of the technology becomes clear and the consumer tool is designed for a single task (eg. iPod).

With this in mind, we should look at the educational sector. What kinds of activities would we like to see become more popular among teachers, so that learning outcomes would improve and the next generation would be well equipped to meet the globalized, digital world? What tools and services are there to support such activity? Are these tools simple enough that any

teacher could, with some moderate effort, learn to use them effectively? Issues of usability and design are the key elements in this analysis.

2 LeMill OER repository and community

LeMill is an example of a tool whose primary design objective has been simplicity. LeMill was developed within the EU-funded CALIBRATE project (Durando, 2008). LeMill is a web community for teachers and OER authors to collaboratively create, improve, share and utilize open learning resources. These resources include conventional learning material, but also descriptions of pedagogical methods and tools, which teachers can use to get new ideas for their teaching. Teachers can even collect material, methods and tools together into teaching and learning stories, where they describe how they've used the resources together and what were their experiences. LeMill and all its open resources are freely available on the web at <http://lemill.net>.

The screenshot shows the LeMill website homepage. At the top, there is a navigation bar with language links (cs, de, en, es, et, fi, fr, hu, ka, it, pl, ru, se) and 'Log in' and 'Join' buttons. Below this is the LeMill logo and a search bar. The main content area is divided into sections: '+ New content', 'Featured content', and 'Browse content'. The 'Featured content' section displays three resource cards: 'Multiplication and division the decimal numbers...', 'Tour around London', and 'Global Warming'. The 'Browse content' section lists filters: 'By language' (Estonian, English, Georgian, ...), 'By title cloud', 'By subject area' (Mathematics, Informatics or ICT, Natural sciences, ...), and 'By target group' (11th grade, 10th grade, 12th grade, ...). At the bottom, there are links for 'What's going on?' and 'FAQ', and a footer with 'About | Blog | FAQ | LeMill development site | Feedback / Report a problem'.

Figure 1. Each main section has a front page, which highlights some interesting resources, and allows browsing of the repository using various criteria. All pages feature the main sections on the top, and contextual actions on the left. Most common languages, subject areas, target groups and tags are displayed as shortcuts.

cs | de | en | es | et | fi | fr | hu | ka | lt | pl | ru | se [Log in](#) [Join](#)

LeMill


Content | Methods | Tools | Community

[+ New content](#) **Browse content**

Language: English (119)
 Subject area: Foreign languages (119)
 Target group: All
 Tag: All
 Type: All
 Only published:

[Show](#)

Learning resources




[Tour around London](#)

Authors: [Janina Pukeliene](#)

Tags: [london](#), [tour](#), [around](#), [england](#), [famous places](#), [interest](#)

Language: English




[Listen to this](#)

Authors: [Leo Vandijck](#) , [Teemu Leinonen](#)

Tags: [english](#), [grammar](#), [spelling](#)

Language: English



[Prepositions in pictures](#)


Authors: [Genovaitė Mockuvienė](#)

Tags: [in](#), [under](#), [on](#), [between](#), [in front of](#), [behind](#), [where](#), [is](#), [are](#), [a cat](#), [a dog](#), [a kitten](#), [a puppy](#)

Language: English

Figure 2. The browse view shows resources matching the selected criteria (here: Foreign language learning resources in English). The powerful filtering tools allow users to quickly drill down to find the resources they're most interested in. Empty space and cover images are used to make the list easy on the eye.

LeMill
Edit, tips for use and more...



Crop circle challenge and patterns

by [Ivan De Winne](#) — last modified 2008-06-18 11:51

Geometry is one of the most fascinating, challenging and useful branches of mathematics and has been at the very heart of civilisation, playing a major role in architectural, engineering and artistic endeavours.

Geometry can also be found in less obvious settings. For example, have you ever thought about the geometry of crop circles? Crop circles (in French: les agroglyphes; in German: Kornkreise) are geometric or non-geometric designs in crops or vegetation. They appear in the form of one simple circle, multiple circles or more extensive and complicated patterns. The dimensions of crop circles differ too. Simple circles can have a diameter of just a few metres, but more complicated patterns can be as big as several football fields. These figures are most commonly witnessed in the South of England, in areas close to old places of worship like Stonehenge or Avebury.

The Internet offers a lot of information (and unfortunately a lot of nonsense too) about how crop circles are formed. Theories of the origin differ: some see the circles as the messages of aliens, some think they are the result of exceptional weather conditions, and others think they are hoaxes produced by well organised circle-makers. One thing cannot be denied: the makers of crop circles must have a sound knowledge of geometry.

The purpose of this article, however, is not to investigate how crop circles are made but to demonstrate how the geometric patterns in crop circles can be used to encourage students' interest and understanding of geometry. By using patterns from art, architecture or science, the Crop Circle Challenge can also be extended to a range of interdisciplinary topics.

The Crop Circle Challenge is a very successful project among European students, age 12-18, from secondary schools in Belgium, Italy and Greece, where they have to reproduce crop circle patterns using only a compass and ruler constructions.

This Crop Circle Challenge is the first step towards real partnerships between schools. Those schools involved will naturally develop and create exchanges on other subjects by being involved in this project. Using recently acquired funding for a multidisciplinary and cross-curriculum European Comenius project, involving

Figure 3. Student view of a learning resource. Each resource has a permanent address, which can be referred to from a virtual learning environment. The student view hides all LeMill navigation elements except for the green bar at the top, allowing students to focus on the actual content.

All resources in LeMill are readable using a standard web browser, although some multimedia content requires the Flash plugin. No other software is necessary. All resources and their metadata are also editable using a browser, although of course multimedia content needs to be authored using appropriate software tools.

The screenshot shows the LeMill website interface. At the top, there are language links (cs, de, en, es, et, fi, fr, hu, ka, lt, pl, ru, se), a search bar, and 'Log in' and 'Join' buttons. The main navigation includes 'Content', 'Methods', 'Tools', and 'Community'. The page title is 'Crop circle challenge and patterns' by Ivan De Winne, last modified 2008-06-18 11:51. A small image of a crop circle is shown. On the left, there are several action buttons: 'Edit...', 'About', 'History', 'Discussion', 'View collections (2)', 'Translate...', 'English', and 'Student view'. The main content area contains several paragraphs of text discussing the geometry of crop circles, their formation theories, and the 'Crop Circle Challenge' project.

Figure 4. Normal learning resource view (compare to figure 3). Each page has the same consistent structure: main navigation at the top, context-specific actions on the left.

Resources can be collaboratively edited. LeMill automatically keeps track of the changes each author has made, and assigns authors in the correct order for each resource. As in conventional wikis, each resource has a full history, allowing visitors to see what changes each author has made.

LeMill is a multilingual environment, with numerous complete user interface translations available. The resources can be written in any language, and translating resources from one language to another is supported and encouraged.

LeMill seems to have been a very successful development project. Proof of this can be seen from the growth during the first 18 months of operation, both of its community membership (2800 members in the summer 2008) and its OER repository (over 2000 resources), with an average growth rate of 10% monthly. In addition, Georgians have established their own repository at <http://ge.lemill.net>, with over 1500 members and 3000 resources, and Estonians are setting up their own national repositories based on LeMill. LeMill was highly praised by both the EU reviewers of the project, as well as the teachers participating in the project. It should be noted that in just 1,5 years of operation LeMill has grown to be one of the largest OER

repositories on the internet. While the quality of individual resources is quite varied, the same can be said of all other OER repositories.

3 Lessons learned in developing LeMill

3.1 Development methodology

Figure 5 depicts the design and development process used during the 3 years of creating LeMill. The process started with a contextual inquiry into the working habits of teachers, followed by participatory design sessions where teachers responded to various scenarios of using OER in their work. The sessions were recorded and analyzed to produce the first design challenges for the project.

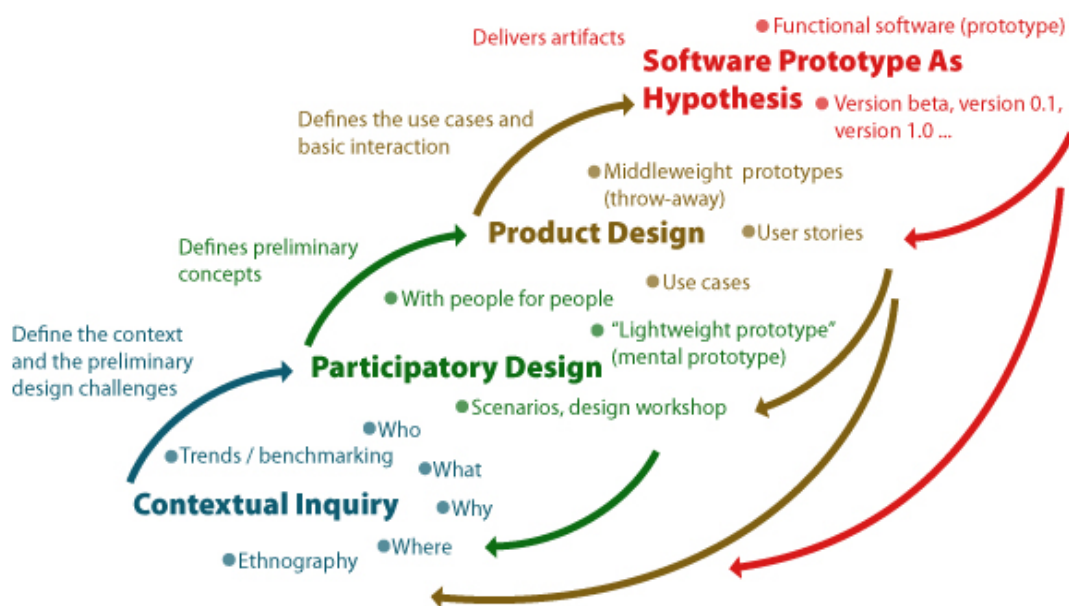


Figure 5. The 'Software as Hypothesis' life cycle model. The four main activities start out in sequence, but then continue in parallel in short 2-5 week iterations, with feedback to each stage as appropriate.

The most fundamental aspect of the design process was its highly iterative nature. The first prototype was released a month after the beginning of work. During the 3 years of development, a new version of the service was released every 2-5 weeks. Teacher feedback was collected on a continuous basis and given to the designers. This feedback was analyzed to see the rationale behind it, and then turned into design solutions to be implemented in the next release. Many wishes were not followed, as they were not consistent with the project's pedagogical goals of collaborative learning. The process is described in more detail in a separate publication (Leinonen et al., in press).

LeMill was developed using agile methodologies, based on SCRUM (Schwaber and Beedle, 2001) and XP (Beck, 1999), which allowed us to release new prototypes often, to accommodate feedback at any time, and to change and rechange aspects of the repository as designers altered their solutions. During the three years, numerous design solutions were proposed, many of them were implemented, and quite a few were redesigned based on user feedback, sometimes over and over, until a satisfactory solution was found.

3.2 Critical mass

Unlike many OER repositories that have authoritative content, LeMill relies on grassroots activity to get new content. All resources are created and edited by volunteer teachers and content authors. The success of LeMill shows that a grassroots OER repository can grow to be so valuable that it attracts new members and new resources by itself. It also shows that this autonomous growth requires a critical mass of members and resources, and that this critical mass needs to be achieved for each language separately.

For instance it can be seen that in Estonia, at around 150 members and 200 resources the totality started to attract volunteer teachers at an increasing rate, and growth was less reliant on teachers that had been specifically recruited to create resources. Even then, regular workshops to familiarize new teachers with LeMill were necessary.

It should be noted that when developing a growing repository, the design solutions that work in a small repository will need to be altered as the repository grows. For instance, in LeMill new browsing and filtering methods needed to be added as the repository grew. However, these could not have been designed in advance: the usability of a small repository would have suffered from having unnecessary filtering tools, and also the designers could not know in advance the composition of the resources, and thus could not have known which kinds of filters will be needed.

Thus the design decisions need to match the current state of the repository and the community, and coevolve so that the software keeps up with the demands of the community. As the community grows, it becomes stronger and the service needs to cater to its needs. A service that does not benefit its member community will quickly see people switching to a better service.

3.3 Cultural differences

In the CALIBRATE project about 100 teachers in seven countries were recruited to use LeMill and start creating communities in seven languages. As teachers from several countries were involved, the vast differences in educational policy, teaching practices and cultural differences between European countries were highlighted. On a global scale these differences are obviously even more prominent.

As a general observation, it can be said that the former Soviet countries were significantly more ready to accept new pedagogical approaches, open educational resources, and open collaboration on the internet, than were the old European countries. This can possibly be attributed to the former countries' tendency to get rid of many of their existing Soviet-era practices.

Teachers of different subject areas also varied in both the enthusiasm they expressed, and the specific needs that they had. For example language teachers really needed a fill-in-the-gaps exercise, while math teachers needed ways to express mathematical formulae. Both were accommodated.

3.4 Role of teachers and teacher training

In the course of conducting workshops for teachers around Europe, it became clear that training them to only use LeMill was not sufficient. They also needed training in copyright issues, other web 2.0 services, and pedagogical issues. This is problematic in that covering such wide themes in a single session can be overwhelming. In practice, these issues should be covered in several sessions spread out over time.

Based on the experiences of developing LeMill, the most critical design recommendation for an OER repository is to involve actual teachers throughout the development project. Teacher

feedback must be accepted at all times, although it should not be taken at face value. While Victor Papanek has said that all men are designers, the development team needs to have professional designers that analyze the feedback, and make the informed design decisions to serve the common good, not only the needs of individual teachers giving feedback.

In general, involving the end-users means that the developmental life cycle model needs to be iterative in nature. A linear model, such as the waterfall, cannot accommodate changes in the middle of the project.

4 Trinary ecology model for OER repositories

All human activity is dependent on a sufficient reward. That reward is often thought of in monetary terms, but other rewards can be even more influential. Currently LeMill relies on 'fame economy', which many web 2.0 services depend on: members are active because that will increase their fame in the community. This fame can create new opportunities such as book authoring or expert presentations at conferences, or it can convince an employer of one's expertise. Instead of fame, one could also think in terms of portfolios, and a teachers' activity in LeMill forming that teacher's public portfolio. Additionally, the simple act of sharing is shown to increase happiness.

However, the publishers of text books are usually not very keen on freely available, open educational resources. The following is a summary of an alternative trinary economy model involving publishers, teachers, and educational administration, which could be implemented in many OER repositories, such as LeMill.

The hypothetical repository would contain both open and proprietary educational resources. Usage of all resources is tracked. Each teacher is given virtual money, or credits, to use to purchase rights to use proprietary resources. Use of open resources is free, but the educational administration awards additional credits to the authors of open resources based on their popularity. The administration also pays publishers for their proprietary content based on credits used to buy them.

This model will allow teachers to access both open and proprietary resources conveniently. It also encourages teachers to publish their own content as open resources. Publishers of proprietary content are motivated to publish only high quality resources, as they will generate the most income. Educational administration in turn has an affordable method of purchasing teachers exactly the content that they need, instead of buying huge bulk licenses into content portals that may be largely unused.

This model would benefit all stakeholders, and create an ecological environment where both open and proprietary content can live side-by-side, complementing each other. This model is presented here as food for thought, and is free for anyone to implement in their OER repository.

References

Beck, K. (1999). *Extreme programming explained; embrace change*. Addison-Wesley Longman Publishing, MA, USA.

Durando, M. (2008). CALIBRATE Project Final Report. Technical report. IST-028025, European Commission, ITCOLE Project.

Leinonen, T. & Silfvast, K. & Toikkanen, T. & Pöldoja, H. (in press) *Software as hypothesis: a human-centered research-based design method*.

Schwaber, K & Beedle, M. (2001). *Agile Software Development with Scrum*. Prentice Hall, NJ, USA.

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