

Patterns of Peeragogy

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We describe nine design patterns that we have developed in our work on the Peeragogy project, in which we aim to help design the future of learning, inside and outside of institutions, drawing on the principles of free/libre/open source software and open culture. We use these patterns to build an “emergent roadmap” for the project. Our use of design patterns has some novel features that will be relevant to others working in projects with emergent structure.

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1. INTRODUCTION

Readers will have encountered *peer production*, at least in applications like Wikipedia, StackExchange, and free/libre/open source software development. Readers will also be familiar with *peeragogy*, even if the name is unfamiliar. Simply put, peeragogy is active learning together with others. Participants in a peeragogical endeavor collaboratively build emergent structures that are responsive to their changing context. They learn – and they adapt. Taking inspiration from the notable successes of peer production, we are using peeragogy to help design the future of learning, inside and outside of institutions.

We have found design patterns useful for organizing our work on this momentous task. However, there is a difference between the pattern language we present here and previous collections of design patterns that touch on similar domains – like *Liberating Voices: A Pattern Language for Communication Revolution* [Schuler 2008] and *Pedagogical Patterns: Advice for Educators* [Bergin et al. 2012]. At the level of the pattern template, our innovation is simply to add a “What’s next” annotation to each pattern, which anticipates the way the pattern will continue to “resolve” in our work.

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This mirrors the central considerations of our approach, which is all about human interaction, and the challenges, fluidity and lack of predictability that comes with it. Something that works for one person may not work for another or may not even work for the same person in a slightly different situation. Nevertheless, it is hard to argue with a formula like “If W applies, do X to get Y.” In our view, other pattern languages often achieve this sort of common sense rationality, and then stop. Failure in the prescriptive model only begins when people try to define things more carefully and make context-specific changes – when they actually try to put ideas into practice. The problem lies in the inevitable distance between *do as I say*, *do as I do*, and *do with me* [Deleuze 2004, p. 26].



Fig. 1. A prototypical university. Caption reads: “Wisconsin State University, Madison, Wis. 1879”. Inset captions describe the pictured buildings: “Ladies Hall, South Dormitory, University Hall, Assembly Halls & Library, North Dormitory, Science Hall, President’s Residence, University Farm, and Washburn Observatory.” Public domain.

This paper outlines a new approach to the organization of learning, drawing on the principles of free/libre/open source software (FLOSS) and open culture. Mako Hill suggests that one recipe for success in peer production is to take a familiar idea – his example is an encyclopedia – and make it easy for people to participate in building it [Hill 2013, Chapter 1]. Another inspiring familiar idea is the university. We will take hold of “learning in institutions” as a map (Figure 1), though it does not fully conform to the tacitly-familiar territory of peeragogy. To be clear, peeragogy is not just for teachers and students, but for *any group of people who want to learn anything*.¹

Indeed, the strong version of our claim is that peeragogy is needed in applications of any map, blueprint, or design that seeks to involve people as people. In some idealized sense, “control” is all that’s required to move from a well-thought-out design to successful execution. But, at the very least, this leaves the question: where do the designs come

from in the first place [Von Foerster 1979]? Once they exist, designs need to be interpreted, and often, revised. People may think that they are on the same page, only to find out that their understandings are wildly different. For example, everyone may agree that the group needs to go “that way.” But how far? How fast? It is rare for a project to be able to set or even define all parameters accurately and concisely at the beginning.

This is true for pattern languages as well. We describe them in text, but they become a “living language” [Alexander et al. 1977, p. xvii] just insofar as they are linked to action. Many things have changed since Alexander suggested that “you will get the most ‘power’ over the language, and make it your own most effectively, if you write the changes in, at the appropriate places in the book” [Alexander et al. 1977, p. xl]. We see more clearly that we can build living designs, and inscribe their changing form not just in the margins of a book, or even a shared wiki, but in the lifeworld itself.

Although we are often thinking about learning and adaptation that takes place far outside of formal institutions, the historical conception of the university can offer some guidance. The model university is not separate from the life of the state or its citizenry, but aims to “assume leadership in the application of knowledge for the direct improvement of the life of the people in every sphere” [Curti et al. 1949, p. 88]. Research that *adds to the store of knowledge* is another fundamental obligation [Curti et al. 1949, p. 550].

Our emergent approach to collaboration and knowledge-building is likely to be of interest to theorists in fields like organization studies and, perhaps surprisingly, computer science, where researchers are increasingly making use of social approaches to software design and development (e.g., via the Manifesto for Agile Software Development)

¹<https://www.youtube.com/watch?v=TDRGJzoNbAc>

as well as agent-based models of computation and learning [Minsky 1967; Corneli et al. 2015]. The design pattern community in particular is very familiar with practices that we think of as peeragogical, notably shepherding and writers workshops [Harrison 1999; Coplien and Woolf 1997]. We hope to help design pattern authors and researchers expand on these strengths.

The next section introduces PEERAGOGY more explicitly in the form of a design pattern. Sections 3–10 present the other patterns in our pattern language. Figure 2 illustrates their interconnections. In each pattern description, the key forces that apply within the pattern’s context are highlighted in bold face. Each pattern also includes two examples. The first example shows how the pattern is exhibited in current Wikimedia projects. We have selected Wikimedia as a source of examples because we are relatively familiar with it, and because the relevant data is readily available to readers. The second example shows how the given pattern could be applied in the design of a future university. Whereas existing projects like Wikimedia’s Wikiversity² and the Peer-2-Peer University (P2PU) have created “a model for lifelong learning alongside traditional formal higher education,”³ they stop well short of offering accredited degrees. What would an accredited free/libre/open university offering general education look like? How would it compare or contrast with the typical or stereotypical image of a university from Figure 1?

Each pattern concludes with a “What’s next” annotation, and Section 11 collects these next steps and summarizes the outlook of the Peeragogy project. Section 12 reviews the contributions made in the paper, positioning this work as a hands-on complement to existing sociological and historical research about peer production (surveyed in [Benkler et al. 2015]).

2. PEERAGOGY

Context. Architectural maverick Christopher Alexander asked the following questions to an audience of computer programmers [Alexander 1999]:

“What is the Chartres of programming? What task is at a high enough level to inspire people writing programs, to reach for the stars?”

In order for humanity to pull itself up by its bootstraps, on this planet or any other, we need to continue to learn and adapt. Collaborative projects like Wikipedia, StackExchange, and FLOSS represent an implicit challenge to the old “industrial” organization of work. This new way of working appears to promise something more resilient, more exciting, and more humane. In the context of these free, open, post-modern organizations, individual participants are learning and growing – and adapting the methods and infrastructure as they go. Because everyone in these projects primarily learns by putting in effort on a shared work-in-progress, participants are more in touch with an *equality of intelligence* than an *inequality of knowledge* [Rancière 1987, pp. 38,119]. At the same time, they invoke a form of friendly competition, in which *the best craftsmanship wins* [Raymond 2001, p. 89]. **There is a tension between the inclusiveness of an “open” work and the specificity required in order to develop something really useful. The trust that is required to sustain a culture of learning is only built through sharing and reciprocity.**

Problem. Even a highly successful project like Wikipedia is a work in progress that can be improved to better *empower and engage people around the world, to develop richer and more useful educational content, and to disseminate it more effectively* – and deploy it more creatively.⁴ How to go about this is a difficult question, and we don’t know the answers in advance. There are rigorous challenges facing smaller projects as well, and fewer resources to draw on. Many successful free software projects are not particularly collaborative – and the largest projects are edited only by a small minority of users [Hill 2011; Swartz 2006]. Can we work smarter together?

²<https://www.wikiversity.org/>

³<https://www.p2pu.org/en/>

⁴https://wikimediafoundation.org/wiki/Mission_statement

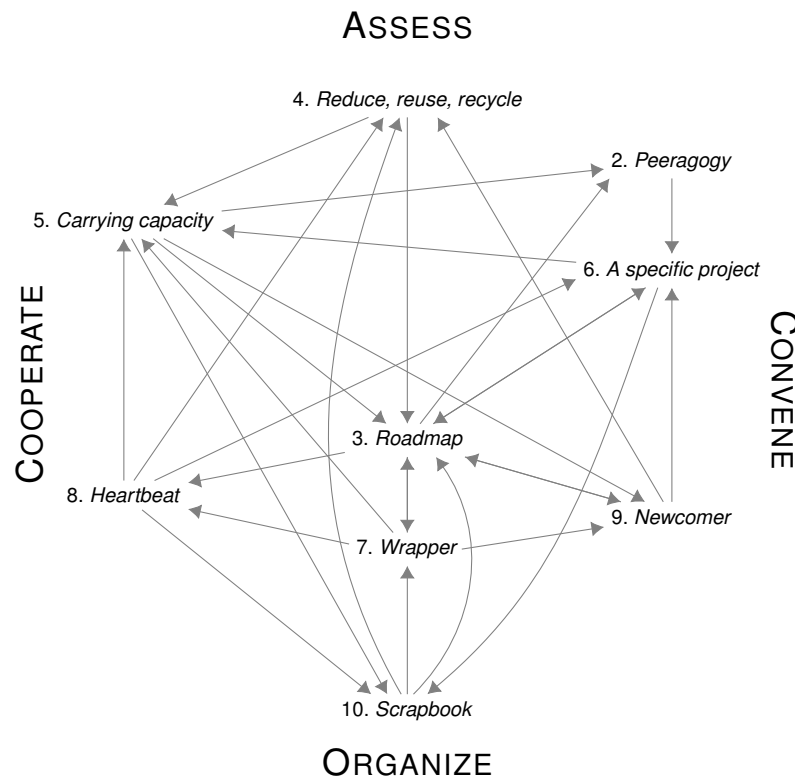


Fig. 2. Connections between the patterns of peeragogy. An arrow points from pattern **A** to pattern **B** if the description of pattern **A** references pattern **B**. Labels at the borders of the figure correspond to the main sections of the *Peeragogy Handbook*.

Solution. People who learn actively together talk to each other about material problems, share practical solutions, and constructively critique works-in-progress. There are many different ways to go about this – bug reports, mailing lists, writers workshops, Q&A forums, watercoolers and skateparks are all places where peeragogy can happen. We have found that the necessary “reflection” aspects of the process are particularly well-matched to Christopher Alexander’s idea of a *pattern language*, in which commonly occurring, interconnected, elements of an optative design are refined until they can be described in terms of a simple template. Indeed, thought of as a design pattern, PEERAGOGY can be understood as an up-to-date revision of Alexander’s NETWORK OF LEARNING [Alexander et al. 1977, p. 99]. It *decentralizes the process of learning and enriches it through contact with many places and people* – in interconnected networks that may reach all over the world. Importantly, while people involved in a peeragogical process may be collaborating on A SPECIFIC PROJECT, they don’t have to be direct collaborators outside of the learning context or co-located in time or space. Peeragogy often takes place in mostly-horizontal relationships between people who have different but compatible objectives.

Rationale. The peeragogical approach particularly addresses the problems of small projects stuck in their individual silos, and large projects becoming overwhelmed by their own complexity. It does this by going the opposite route: explicating *what by definition is tacit* and employing a *continuous design process* [Schümmer et al. 2014, pp. 9–10]. The very act of asking “can we work smarter together?” puts learning front and center. PEERAGOGY takes that “center” and distributes it across a pool of heterogeneous relationships. As pedagogy articulates the transmission of knowledge from teachers to students, peeragogy articulates the way peers produce

and use knowledge together (Figure 2). Active learning together with others brings social and emotional intelligence to bear on the things that matter most.

Resolution. Peeragogy helps people in different projects describe and solve real problems. If you share the problems that you're experiencing in your project, someone may be able to help you solve them. This process can guide individual action in ways that we wouldn't have seen on our own, and may lead to new forms of collective action we would never have imagined possible. Making room for multiple right answers resolves the tension between generality and specificity. The Peeragogy project is one of "tens of thousands of projects in the traditions of world improvement élan – without any central committee that would have to, or even could, tell the active what their next operations should be" [Sloterdijk 2013, p. 402]. When we talk about "next steps," we aim to clarify our own commitments, and show what can be realistically expected from us.

Example 1. Wikipedia and its sister sites rely on user generated content, peer produced software, and are managed, by and large, by a pool of users who choose to get involved with governance and other "meta" duties. Wikimedia's pluralistic approach achieves something quite impressive: the Wikimedia Foundation runs the 7th most popular website in the world, and has around 230 employees. For comparison, the 6th and 8th most popular websites are run by companies with 150K and 30K employees, respectively.

Example 2. Although one of the strengths of PEERAGOGY is to distribute the workload, this does not mean that infrastructure is irrelevant. No less than their predecessors, the students and researchers of the future university will need access to an Observatory and other scientific apparatus if they are truly to reach *ad astra, per aspera*.

What's next. We intend to revise and extend the patterns and methods of peeragogy to make it a workable model for learning, inside or outside of institutions.

3. ROADMAP

Context. PEERAGOGY has both distributed and centralized aspects. The different discussants or contributors who collaborate on a project have different points of view and heterogeneous priorities, but they come together in conversations and joint activities. **Different people will have different goals and interests in mind; some may be quite specific, and some rather vague. Upon further scrutiny, some of these goals will be seen to be well-aligned, others less so.**

Problem. In order to collaborate, people need a way to share current, though incomplete, understanding of the space they are working in, and to nurture relationships with one another and the other elements of this space. Without a sense of our individual goals or how they fit together in the context of addressing outstanding problems, it is difficult for people to help out, or to assess the project's progress. At the outset, there may not even be a project or a vision for a project, but a only loose collection of motivations and sentiments. Once the project is running, people are likely to pull in different directions.

Solution. Building a guide to current and upcoming activities, experiments, goals and working methods can help NEWCOMERS and old-timers alike see where they can jump in. This guide may take various forms, and different levels of detail. It may be a research question or an outline, an organizational mission statement or a business plan. It may be a design pattern or a pattern language [Kohls 2010]. It may combine features of a manifesto, a syllabus, and an issue tracker. The distinguishing qualities of a project ROADMAP are that it should be adaptive to circumstances and that it should ultimately get us from *here* to *there*. By this same token, any given version of the roadmap is seen as fallible. It should be accessible to everyone with an interest in the project, though in practice not everyone will choose to update it. In lieu of widespread participation, the project's WRAPPER should attempt to synthesize an accurate roadmap informed by participants' behavior, and should help moderate in

case of conflict. However, full consensus is not necessary. Different goals, with different *heres* and *theres*, can be pursued separately, while maintaining communication. To the extent that it's possible, combining everyone's individual plan into an overall ROADMAP can help give everyone a sense of what's going on.

Rationale. Unless the project's plan is easy for people to see and to update, they are not likely to use it, and are less likely to get involved. The key point of the roadmap is to help support involvement by those who *are* involved. The level of detail in the roadmap (and the existence of a roadmap at all) should correspond to the felt need for sharing information and to the tolerance of uncertainty among participants. The structure of the roadmap should be able shift along with its contents: it is an antidote to TUNNEL VISION [Dikel et al. 2001, pp. 121–124]. In the Peeragogy project our roadmap evolved from an outline of the first draft of the *Peeragogy Handbook*, to a schedule of meetings with a regular "HEARTBEAT" supplemented by a list of upcoming submission deadlines, to the emergent objectives listed in Section 11 of the current paper. By contrast, we've seen that a list of nice-to-have features is comparatively unlikely to *go* anywhere. A backlog of tasks and a realistic plan for accomplishing them can be vastly different things. An adaptive roadmap that incorporates multiple simultaneous solution paths can achieve integration around core values without over-determining or over-constraining participation.

Resolution. Using the pattern catalog as an organizational tool gives us a robust mechanism for building and maintaining a "distributed", and ultimately "emergent" roadmap – whose components are rooted in real problems and justifiable solutions, with a concrete resolution and followthrough. When these components are put together, we get a reasonably coherent and actionable idea of where the project is going. The roadmap can give NEWCOMERS a reasonable idea of what it would mean to participate in the project, and can help them decide whether, where, and how to get involved.

Example 1. The *Help* link present on every Wikipedia page could be seen as a localized ROADMAP for individual user engagement.⁵ It tells users what they can do on the site:

I want to read or find an article; I want to edit an article; I want to report a problem with an article; I want to create a new article or upload media; I have a factual question. . . [Etc.]

Community-organized WikiProjects and official Wikimedia projects announce their objectives and invite others to get involved (cf. A SPECIFIC PROJECT). Wikimedia previously developed a detailed strategic plan drawing on community input [Kim et al. 2011]. The current description of the State of the Wikimedia Foundation includes a pointer to a two-week 2015 Strategy Community Consultation (now closed for purposes of review and synthesis).^{6,7,8}

Example 2. In the future university, maintaining a special President's Residence would presumably be an undue opulence. However it may be appropriate for project facilitators to gather at a University Hall for the primary purpose of working together on the university's ROADMAP. For now, we mostly meet online, and in person less frequently: at cafes, when passing through town, or at conferences. In New York alone, there are a million members of meetup.com with similar habits, although they most likely have never heard of peeragogy.⁹ There is strength in numbers – and there is leverage in organization. Whatever we balance we strike between "global" and "local" operations, the purpose of our roadmap is to help us get organized.

What's Next. If we sense that something needs to change about the project, that is a clue that we might need to record a new pattern, or revise our existing patterns.

⁵<https://en.wikipedia.org/wiki/Help:Contents>

⁶https://meta.wikimedia.org/wiki/Communications/State_of_the_Wikimedia_Foundation

⁷<https://blog.wikimedia.org/2015/02/23/strategy-consultation/>

⁸https://meta.wikimedia.org/wiki/2015_Strategy/Community_consultation

⁹<http://blog.meetup.com/thanks-a-million-ny/>

4. REDUCE, REUSE, RECYCLE

Context. In a peer production context, you are simultaneously “making stuff” and building on the work of others. **You don’t have to do everything yourself! The library of resources you can draw on is vast – but it is useful only if you can make sense of it.**

Problem. People are often very attached to their own projects and priorities and don’t have a sense of how their initiatives can benefit from connection and relationship. Many projects die because the cost of REINVENTING THE WHEEL [c2] is too high.

Solution. “Steal like an artist,” and make it possible for other people to build on your work too (Figure 3). In the Peeragogy project, we have written very little new software, and have instead used off-the-shelf and hosted solutions suited to the task at hand (including: Drupal, Google+, Google Hangouts, Google Docs, Wordpress, pandoc, XeLaTeX, Authorea, and Github). Early on we agreed to release our *Peeragogy Handbook* under the terms of the Creative Commons Public Domain Dedication (CC0), the legal instrument that grants the greatest possible leeway to downstream users.¹⁰ This has allowed us and others to repurpose and improve its contents in other settings, including the current paper. In short, follow the steps indicated by the keywords in the pattern’s title: *Reduce* the panoply of interesting interrelated ideas and methods to a functional core (e.g. writing a book). *Reuse* whatever resources are relevant to this aim, factoring in “things I was going to have to do anyway” from everyone involved. *Recycle* what you’ve created in new connections and relationships.



Fig. 3. A paradigmatic example of found-art. Caption reads: “Fountain by R. Mutt, Photograph by Alfred Stieglitz, THE EXHIBIT REFUSED BY THE INDEPENDENTS”. Public domain, via the Wikimedia Commons.

Rationale. Clearly we are not the first people to notice the problems with wheel-reinvention, including “missing opportunities, repeating common mistakes, and working harder than we need to.”¹¹ As a guest in one of our hangouts, Willow Brugh, of Geeks without Bounds and the MIT Media Lab, remarked that *people often think that they need to build a community, and so fail to recognize that they are already part of a community.*¹²

Resolution. Peeragogy per se is not new, and it’s not something we can bottle and sell. It appears in avocational, academic, and industrial contexts. We can, however, learn how to be more capable peeragogues with practice. Reweaving old material into new designs and new material into existing frameworks, we build deeper understanding. The project’s ROADMAP develops by making sense of existing resources – including worries and concerns. This boosts our collective CARRYING CAPACITY.

Example 1. Users are encouraged to recycle existing works that are compatible with the Wikimedia-wide CC-BY-SA license, and the mission of the respective sites (e.g. books on Wikibooks or Wikisource, dictionary entries on Wiktionary, encyclopedic writing on Wikipedia, etc.). Subprojects have existed purely to help repurpose other existing works in this way.¹³ On the downstream side, DBPedia is an important resource for the

¹⁰<https://creativecommons.org/publicdomain/zero/1.0/>

¹¹<https://blog.wikimedia.org/2013/11/19/learning-patterns-new-way-share-important-lessons/>

¹²<https://www.youtube.com/watch?v=NpyQfYVKfBI>

¹³https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Mathematics/PlanetMath_Exchange

semantic web, built by collating data from Wikipedia's "infoboxes".¹⁴ Researchers have been able to REDUCE, REUSE, RECYCLE in other ways, e.g. by developing tools for building learning paths through Wikipedia content, or that show heatmaps of editing activity. However, these research projects do not always result in a tool that is accessible to day-to-day users.

Example 2. The knowledge resources and collaboration tools currently available online are what make a low-cost, high-quality, formally-accredited future university conceivable. However, the available resources are not always as organized as they would need to be for educative purposes, so peeragogues can usefully put effort into REDUCE, REUSE, RECYCLE'ing available resources into a functioning university Library.

What's Next. We've converted our old pattern catalog from the *Peeragogy Handbook* into this paper, sharing it with a new community and gaining new perspectives. Can we repeat that for other things we've made?

5. CARRYING CAPACITY

Context. One of the important maxims from the world of FLOSS is: "Given enough eyeballs, all bugs are shallow" [Raymond 2001, p. 30]. A partial converse is also true. **There's only so much any one person can do with limited resources and a limited amount of time. Furthermore, in a peeragogy context, it is often impossible to delegate work to others. Lines of responsibility are not always clear, and people can easily get burnt out. Our concern is not simply "inclusion" but rather to help everyone involved fulfil their potential. This will not happen for someone who takes on too much, or someone who takes on too little.**

Problem. How can we help prevent those people who are involved with the project from overpromising or overcommitting, and subsequently crashing and burning? First, let's be clear that there are lots of ways things can go wrong. Simplistic expectations – like *assuming that others will do the work for you* [Torvalds and Vaughan-Nichols 2011] – can undermine your ability to correctly gauge your own strengths, weaknesses, and commitments. Without careful, critical engagement, you might not even notice when there's a problem. Where one person has trouble letting go, others may have trouble speaking up. Pressure builds when communication isn't going well.

Solution. Symptoms of burnout are a sign that it's time to revisit the group's ROADMAP and your own individual plan. Are these realistic? Frustration with other people is a good time to ask questions and let others answer. Do they see things the same way you do? Your goals may be aligned, even if your methods and motivations differ. If you have a "buddy" they can provide a reality check. Maybe things are not *that hard* after all – and maybe they don't need to be done *right now*. Generalizing from this: the project can promote an open dialog by creating opportunities for people to share their worries and generate an emergent plan for addressing them [Seikkula and Arnkil 2006]. Use the project SCRAPBOOK to make note of obstacles. For example, if you'd like to pass a baton, you'll need someone there who can take it. Maybe you can't find that person right away, but you can bring up the concern and get it onto the project's ROADMAP. The situation is always changing, but if we continue to create suitable checkpoints and benchmarks, then we can take steps to take care of an issue that's getting bogged down.

Rationale. Think of the project as an ecosystem populated by acts of participation. As we get to know more about ourselves and each other, we know what sorts of things we can expect, and we are able to work together more sustainably [Ostrom 2010]. We can regulate our individual stress levels and improve collective outcomes by discussing concerns openly.

Resolution. Guiding and rebalancing behaviour in a social context may begin by simply speaking up about a concern. What we learn in this process is consistent with inclusivity [Garrison and Akyol 2013], but goes further,

¹⁴<http://wiki.dbpedia.org/>

as participants are invited to be candid about what works well for them and what does not. As we share concerns and are met with care and practical support, our actions begin to align better with expectations (often as a result of forming more realistic expectations). When we have the opportunity to express and rethink our concerns, we can become more clear about the commitments we're prepared to make. As we become aware of the problems others are facing, we often find places where we ourselves have something to learn.

Example 1. Wikipedia aims to emphasize a neutral point of view, but its users are not neutral.¹⁵ Wikipedia is relevant to things that matter to us. It helps inform us regarding our necessary purposes – and we are invited to “speak up” by making edits on pages that matter to us. However, coverage and participation are not neutral in another sense. More information on Wikipedia deals with Europe than all of the locations outside of Europe [Graham et al. 2014]. A recent solicitation for donations to the Wikimedia Foundation says “Wikipedia has over 450 million readers. Less than 1% give.” As we remarked in the PEERAGOGY pattern, most of the actual work is contributed by a small percentage of users as well. Furthermore, the technology limits what can be said; [Graham et al. 2014] remark on “the structural inability of the platform itself to incorporate fundamental epistemological diversity.” Finally, the overall population of editors is an important concern for the Wikimedia Foundation: the total number of active editors has been falling since 2007.¹⁶

Example 2. A separate Ladies Hall seems entirely archaic. Progressive thinkers have for some time subscribed to the view that “there shall be no women in case there be not men, nor men in case there be not women” [Rabelais 1894, Chapter 1.LII]. However, in light of the extreme gender imbalance in free software, and still striking imbalance at Wikipedia [Ghosh et al. 2002; Reagle 2012], it will be important to do whatever it takes to make women and girls welcome, not least because this is a significant factor in boosting our CARRYING CAPACITY.

What's Next. Making it easy and fruitful for others to get involved is one of the best ways to redistribute the load. This often requires skill development among those involved; compare the NEWCOMER pattern.

6. A SPECIFIC PROJECT

Context. We often find ourselves confronted with what seems to be a difficult, complex, or even insurmountable problem. It won't go away, but a workable solution doesn't present itself, either. If there is a candidate solution, it's also clear there are not enough resources for it to be feasible. **In the face of serious difficulties we often find ourselves wringing our hands, or preaching to the choir about things they already know. It is harder to make actionable plans and follow them through to bring about concrete change.**

Problem. We are often blinded by our own prejudices and preferences. Considerable energy goes into pondering, discussing, exploring and feeling stuck. Meanwhile there may be a strong urge to make more concrete progress, and time is passing by. In a group setting, when the forward-movers ultimately try to act, those who are more wrapped up in the experience of pondering and exploring may attempt to shut them down, if they feel that they are being left behind. Inaction may seem like the only safe choice, but it has risks too.

Solution. One of the best ways to start to make concrete progress on a hard problem is to ask a specific question. Formulating a question helps your thinking become more concrete. Sometimes you'll see that a solution was within your grasp all along, and you don't actually need to ask the question to anyone anymore. In the case of a truly difficult problem, one question won't be enough, but you can repeat the process: turning something that is too large or too ephemeral to tackle directly into a collection of smaller, specific, manageable tasks that you can learn something from. Maintain an overall project ROADMAP to keep track of how the smaller pieces relate to the

¹⁵https://en.wikipedia.org/wiki/Wikipedia:Neutral_point_of_view

¹⁶https://strategy.wikimedia.org/wiki/Editor_Trends_Study/Results

bigger picture. If you have a fairly specific idea about what you want to do, but you're finding it difficult to get it done, don't just ask for advice: recruit material help (cf. CARRYING CAPACITY).

Rationale. We've seen time and again that asking specific questions is a recipe for getting concrete, and that getting concrete is necessary for bringing about change. Asking for help (which is what happens when you vocalize a question) is one of the best ways to gain coherence. Making yourself understood can go a long way toward resolving deeper difficulties.

Resolution. Where you may have felt stuck or realized you were going in circles, getting specific allows forward progress. The struggle between consensus and action is resolved in a tangible project that combines action with dialog. Learning something new is a strong sign that things are working. Real change starts out "bite-sized."

Example 1. One of the best ways to jump in, get to know other Wikipedia users, and start working on a focused todo list is to join (or start) A SPECIFIC PROJECT. Within Wikipedia, these are known as "WikiProjects."^{17,18} The Wikimedia Foundation also runs public projects, including the Wikipedia Education Program and the GLAM Wiki (for Galleries, Libraries, Archives, and Museums).^{19,20} The latter maintains a *list of case studies that describes specific projects undertaken by cultural organizations and Wikimedia*.²¹

Example 2. Dormitories could be seen as an "optional extra," since studying from where you live is often an option already. However, rented or cooperatively-owned living/working spaces may frequently be an asset for A SPECIFIC PROJECT.

What's Next. We need to build specific, tangible "what's next" steps and connect them with concrete action. Use the SCRAPBOOK to organize that process.

7. WRAPPER

Context. You are part of an active, long-running, and possibly quite complex project with more than a handful of participants. How do you manage? **The project presents a certain user interface to the world. If the primary interface is based on a simple leader/follower dichotomy, then it's easy to know where everyone stands. But peeragogy requires a more sophisticated facilitation/colearning dynamic.**

Problem. In an active project, it can be effectively impossible to stay up to date with all of the details. Not everyone will be able to attend every meeting (see HEARTBEAT) or read every email. Project participants can easily get lost and drift away. The experience can be much more difficult for NEWCOMERS: joining an existing project can feel like trying to climb aboard a rapidly moving vehicle. If you've taken time off, you may feel like things have moved on so far that you cannot catch up. Information overload is not the only concern: there is also a problem with missing information. If they aren't shared, key skills can quickly become bottlenecks (see CARRYING CAPACITY).

Solution. Someone involved with the project should regularly create a wrap-up summary, distinct from other project communications, that makes current activities comprehensible to people who may not have been following all of the details. In addition, project members should keep other informative resources like the landing page, ROADMAP, and documentation up to date. Ensure that these resources accurately represent the facts on the ground, and check empirically to see if they really show interested parties how they can get involved.

¹⁷https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Council/Directory

¹⁸https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Council/Guide

¹⁹https://outreach.wikimedia.org/wiki/Education/Wikipedia_Education_Collaborative/Tasks

²⁰<https://outreach.wikimedia.org/wiki/GLAM>

²¹https://outreach.wikimedia.org/wiki/GLAM/Case_studies

Rationale. According to the theory proposed by Yochai Benkler, for free/open “commons-based” projects to work, it is important for participants to be able to contribute small pieces, and for the project to have a way to stitch those pieces together [Benkler 2002]. The WRAPPER helps perform this integrative stitching function. If you value participation, you may have to do some serious work to facilitate access to process.

Resolution. Regularly circulated summaries can help to engage or re-engage members of a project, and can give an emotional boost to peeragogues who see their contributions and concerns mentioned. Well-maintained records chronicle the project’s history; up-to-date documentation makes the project more robust; a coherent look-and-feel makes it accessible. In short, surfaces matter. People can tell the difference between a project that is led by example and one that is led by fiat; they can see right away if the project welcomes contributions with love, and if the participants feel they have something valuable to share.

Example 1. There are many data streams around the Wikimedia project. They comprise an elaborate WRAPPER function for the project, with components that range from Today’s Featured Article, which appears on the front page of Wikipedia, to formal annual reports from the nonprofit.^{22,23} Wikipedia also plays a WRAPPER function in a broader sense. It is a typical first port of call for people searching for information about the world.

Example 2. In-person meetings are no less relevant for contemporary humans than they were a century ago, even though we often work remotely, and have learned more about how to assemble on the fly [Rheingold 2007]. Getting together for conventions, dance parties, and commencement ceremonies could comprise an important part of the future university’s WRAPPER function, even if these events do not always take place in one specific Assembly Hall.

What’s Next. We have prototyped and deployed a visual “dashboard” that people can use to get involved with the ongoing work in the project. Let’s improve it, and match it with an improved interaction design for peeragogy.org.

8. HEARTBEAT

Context. A number of people have a shared interest, and have connected with each other about it. However, they are not going to spend 24 hours a day, 7 days a week working together, either because they are busy with other things, or because working separately on some tasks is vastly more efficient. **Even if we do spend lots of time together, it isn’t all equally meaningful. Something needs to hold the project together, or it will fall apart.**

Problem. How will the effort be sustained and coordinated sufficiently? How do we know this an active collaboration, and not just a bunch of people milling about? Is there a *there, there*?

Solution. People seem to naturally gravitate to something with a pulse. *Once a day* (standups), *once a week* (meetings), or *once a year* (conferences, festivals) are common variants. When the project is populated by more than just a few people, it’s likely that there will be several HEARTBEATS, building a sophisticated polyrhythm. A well-running project will feel “like an improvisational jazz ensemble” [Dikel et al. 2001]. Much as the band director may gesture to specific players to invite them to solo or sync up, a project facilitator may craft individual emails to ask someone to lead an activity or invite them to re-engage. Two common rhythm components are weekly synchronous meetings with an open agenda, combined with *ad hoc* meetings for focused work on A SPECIFIC PROJECT. The precise details will depend on the degree of integration required by the group.

²²https://en.wikipedia.org/wiki/Wikipedia:Today%27s_featured_article

²³https://wikimediafoundation.org/wiki/Annual_Report



Fig. 4. Design for a Peeragogy project dashboard (design sketch by Amanda Lyons, prototype by Fabrizio Terzi; images used with permission).

Rationale. The project's heartbeat is what sustains it. Just as *people matter more than code* [Torvalds and Vaughan-Nichols 2011], so does the life of the working group matter more than mechanics of the work structure. Indeed, there is an quick way to do a reality check and find the project's strongest pulse: the activities that sustain a healthy project should sustain us, too (cf. CARRYING CAPACITY).

Resolution. Used mindfully, the HEARTBEAT can be a sophisticated tool. Noticing when a new HEARTBEAT is beginning to emerge is a way to be aware of the shifting priorities in the group, and may be a good source of new patterns. Like a HEARTBEAT, patterns recur. On the other hand, if a specific activity is no longer sustaining the project, stop doing it, much as you would move an out-of-date pattern to the SCRAPBOOK in order to make room for other concerns. The power of the HEARTBEAT is that the project can be as focused and intensive as it needs to be.

Example 1. The yearly in-person gathering, Wikimania, is the most visible example of a HEARTBEAT for the Wikimedia movement.²⁴ Local chapters and projects may run additional in-person get-togethers.²⁵ Also of note is the twice-yearly call for proposals for individual engagement grants.²⁶

Example 2. Although it may sound quaint, working farms could help to physically sustain peeragogues, while putting the project's HEARTBEAT in tune with that of the seasons. In the current distributed mode, we tend our windowboxes and allotment gardens.

What's Next. Identifying and fostering new HEARTBEATS and new working groups is a task that can help make the community more robust. This is the time dimension of spin off projects described in REDUCE, REUSE, RECYCLE.

²⁴<https://meta.wikimedia.org/wiki/Wikimania>

²⁵<http://wikiconferenceusa.org/>

²⁶<https://meta.wikimedia.org/wiki/Grants:IEG>

9. NEWCOMER

Context. When there's learning happening, it's because there is someone who is new to a topic, or to something about the topic. **There is an 'invisible hand' in peeragogy that makes it so that each person pursuing his or her own optimal course of learning is what's best for the community. However, this does not isolate us from one another, but draws us together.**

Problem. Newcomers can feel overwhelmed by the amount of things to learn. They don't know where to start. They may have a bunch of ideas that the oldtimers have never considered – or they may think they have new ideas, which are actually a different take on an old idea; see REDUCE, REUSE, RECYCLE. People who are new to the project can tell you what makes their participation difficult. Since you're learning as you go as well, you can ask yourself the same question: what aspects of this are difficult for me?

Solution. In an active learning context, we render assistance to others more effectively when we do so as peers, rather than doing it as experts operating in a *provisionist* mode [Boud and Lee 2005]. Instead of thinking of newcomers as “them”, and trying to provide solutions, we focus on newcomers as “us” – which makes the search for solutions that much more urgent. We permit ourselves to ask naive questions. We entertain vague ideas. We add concreteness by trying A SPECIFIC PROJECT. We may then genuinely turn to others for help.

Rationale. Sharing vulnerability and confusion gives us a chance to learn together. A newcomer's confusion about how best to get involved or what the point of all this actually is may be due to a lack of structure in the project ROADMAP, and it points to places where others in the project probably have something to learn too.

Resolution. An awareness of the difficulties that newcomers face can help us be more compassionate to ourselves and others. We become open to new ideas, which can show how we have been limiting ourselves. Relative to the goals of effecting real change and enhancing the world's liveability, we really are beginners. We will have a better chance of making the project useful for others if we're clear about how it is useful to *us*.

Example 1. Wikipedia NEWCOMERS can make use of resources that include a “Teahouse” where questions are welcomed, a platform extension that changes the user interface for new editors, and lots of documentation.^{27,28,29} The efforts of exceptional newcomers may be given special recognition.³⁰ Newcomer “survival” is of interest to the Wikimedia Foundation.³¹ The degree to which Wikimedia projects emphasize continuous upskilling (à la the NEWCOMER pattern) is somewhat less clear.

Example 2. It will often be pragmatic to connect NEWCOMERS with employment, so that the future university may see a closer coupling of science and industry than is held in the former model. Inspiration can be drawn the London-based freelancing cooperative Founders&Coders, which is able to offer intensive training in web development at no cost to successful applicants, on the basis that some trainees will choose to join the cooperative as paying members later on.³²

What's Next. A more detailed (but non-limiting) “How to Get Involved” walk-through or “DIY Toolkit” would be good to develop. We can start by listing some of the things we're currently learning about.

²⁷<https://en.wikipedia.org/wiki/Wikipedia:Teahouse>

²⁸<https://en.wikipedia.org/wiki/Wikipedia:GettingStarted>

²⁹<https://en.wikipedia.org/wiki/Help:Editing>

³⁰https://en.wikipedia.org/wiki/Template:The_New_Editor%27s_Barnstar

³¹https://meta.wikimedia.org/wiki/Research:Newcomer_survival_models

³²<http://www.foundersandcoders.com/academy/>

10. SCRAPBOOK

Context. We've maintained and revised our pattern catalog over a period of years. We're achieving the "What's Next" steps attached to some of the patterns. **We have limited energy, and therefor need to ask: where should we set the focus?**

Problem. Not all of the patterns we've noticed remain equally relevant. In particular, some of the patterns no longer lead to concrete next steps.

Solution. In order to maintain focus, is important to "tune" and "prune" the collection of patterns receiving active attention. Connect this understanding to concrete actions undertaken in the project by frequently asking questions like these:

- (1) Review what was supposed to happen. (2) Establish what is happening/happened. (3) Determine what's right and wrong with what we are doing/have done. (4) What did we learn or change? (5) What else should we change going forward? [Rheingold et al. 2015, Chapter 28].

After reviewing our activities with respect to these questions, our current priorities will become clearer. If a particular pattern is no longer of current relevance, move it to a SCRAPBOOK.³³ In addition to retired patterns, use the scrapbook to maintain a backlog, or "parking lot," of proto-patterns, in the form of outstanding problems, issues, and concerns. Don't limit yourself to *your own* creativity: include bookmarks to or clippings from patterns from other sources (see REDUCE, REUSE, RECYCLE).

Rationale. We want our pattern catalog to be concretely useful and actively used, and to keep attention focused on the most relevant issues. If a pattern is not specifically useful or actionable at the moment, sufficient time for reflection may offer a better understanding, or it may prove useful in a different context.

Resolution. Judicious use of the SCRAPBOOK can help focus project participants, and can make it easier to communicate current priorities to others in a clear manner. The currently active pattern catalog is leaner and more action-oriented as a result. A realistic and useful focus takes both the past and the future into account. If the ROADMAP shows where we're going, it is the SCRAPBOOK that shows most clearly where we've been.

Example 1. Now that new plans are being formed, the Wikimedia Foundation's previous "five year plan" somewhat resembles a SCRAPBOOK [Kim et al. 2011].

Example 2. In the future university, the patterns described here will continue to shape the landscape, but considerable activity will be focused on new problems and new patterns – just as a university campus grows and changes with the addition of new buildings.

What's Next. After pruning back our pattern catalog, we want it to grow again: new patterns are needed. One strategy would be to "patternize" the rest of the *Peeragogy Handbook*.

11. EMERGENT ROADMAP

This section reprises the "What's Next" steps from all of the previous patterns, offering another view on the Peeragogy project's ROADMAP in a concrete emergent form.

Peeragogy. We intend to revise and extend the patterns and methods of peeragogy to make it a workable model for learning, inside or outside of institutions.

³³<http://paragogy.net/Scrapbook>.

Roadmap. If we sense that something needs to change about the project, that is a clue that we might need to record a new pattern, or revise our existing patterns.

Reduce, reuse, recycle. We've converted our old pattern catalog from the *Peeragogy Handbook* into this paper, sharing it with a new community and gaining new perspectives. Can we repeat that for other things we've made?

Carrying capacity. Making it easy and fruitful for others to get involved is one of the best ways to redistribute the load. This often requires skill development among those involved; compare the NEWCOMER pattern.

A specific project. We need to build specific, tangible "what's next" steps and connect them with concrete action. Use the SCRAPBOOK to organize that process.

Wrapper. We have prototyped and deployed a visual "dashboard" that people can use to get involved with the ongoing work in the project. Let's improve it, and match it with an improved interaction design for peeragogy.org.

Heartbeat. Identifying and fostering new HEARTBEATS and new working groups is a task that can help make the community more robust. This is the time dimension of spin off projects described in REDUCE, REUSE, RECYCLE.

Newcomer. A more detailed (but non-limiting) "How to Get Involved" walk-through or "DIY Toolkit" would be good to develop. We can start by listing some of the things we're currently learning about.

Scrapbook. After pruning back our pattern catalog, we want it to grow again: new patterns are needed. One strategy would be to "patternize" the rest of the *Peeragogy Handbook*.

12. CONCLUSION

We introduced nine patterns of peeragogy and connected them to concrete next steps for the Peeragogy project. In order to demonstrate the generality of these patterns, we included examples showing how they manifest in current Wikimedia projects, and how the patterns could inform the design of a future university rooted in the values and methods of peer production. We will close by reviewing our contribution using three dimensions of analysis borrowed from [Benkler et al. 2015].

Organization. Managing work on our project with design patterns that are augmented with a "What's next" follow through step *decentralizes both goal setting and execution* [Benkler et al. 2015], reintegrating structure in the form of an emergent ROADMAP. We have aimed to make our discussion general and our methods extensible enough to work at varied levels of scale and degrees of formality, inside or outside of institutional frameworks.

Motivation. The future university may be the Chartes of programming, but it will have plenty in common with the bazaar [Raymond 2001]. As P2PU cofounder Philipp Schmidt indicates, *learning is at the core of peer production communities* [Schmidt 2009]. Our patterns help to explicate the way these communities work, but more importantly, we hope they will foment a culture of learning.

Quality. "By intervening in real communities, these efforts achieve a level of external validity that lab-based experiments cannot" [Benkler et al. 2015]. The "What's next" annotation piloted here will be helpful to other design pattern authors who aim to use patterns as part of a research intervention. Peer production is not guaranteed to out-compete proprietary solutions [Benkler et al. 2015; Hill 2011]; its potential for success will depend on the way problems are framed, and our ability to follow through.

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