

Iterate to Innovate

How scholarly publishers can use Agile methodologies to respond to change more effectively



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Executive Summary

The increase in new Open Access (OA) initiatives and mounting calls for more equitable, rapid, and interoperable research dissemination spurred by the COVID-19 pandemic and other global crises have turned the once relatively predictable world of academic publishing on its head. As discussed by David Crotty, Editorial Director of Journals Policy at Oxford University Press, for an industry that has primarily adhered to the evolutionary theory of "gradualism," recent events appear to be shifting scholarly publishing into that of punctuated equilibria ([Spilka](#)).

At this time of unprecedented flux in the research landscape, building flexibility into publishing processes and planning has never been more critical or more of an opportunity. This paper explores how implementing Agile project management methodologies, which originated in software development and have proven transferable to other industries ([Rigby et al.](#)), can help publishers respond to change more effectively and find ways to improve research access and sustainability in the process.

Key findings and recommendations include:

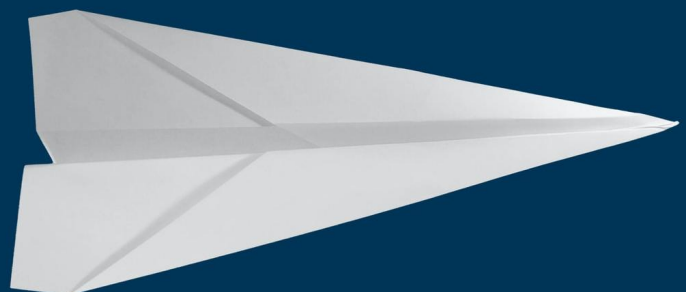
- Pressures to more quickly vet and widely disseminate research spurred by COVID-19 and other global crises have magnified the need for more digitally-driven scholarly publishing practices and infrastructure.
- COVID-19 has also raised awareness of the UN Sustainable Development Goals within academia and the role publishers must play in realizing them, including ensuring equitable access to knowledge and supporting the rapid flow of reliable information ([Conrad](#); [United Nations](#)).
- Recent pushes to increase access to research, from the worldwide COVID-19 crisis response to OA funder initiatives to institutions deciding to move budgets away from subscriptions, could signal a turning point in the OA movement.
- In the rapidly changing research landscape, scholarly publishers must identify ways to efficiently test and implement new journal initiatives to become more digitally-driven, address OA mandates, and leverage opportunities to lower research costs.
- To respond to the accelerating pace of change in the scholarly communication landscape, some publishers have — knowingly or not — implemented Agile project management methodologies to launch new initiatives ranging from OA publishing pilots to rapid peer review processes.
- Agile project management methodologies could be harnessed by publishers long term to more effectively respond to change by making iterative publishing plans that have faster assessment cycles and the flexibility to pivot if a chosen approach isn't working as desired.

Introduction

Embracing Agile principles could help journal publishers more efficiently identify ways to adapt to the changing research landscape, especially those with smaller programs.

Recently enacted Open Access (OA) mandates like Plan S and global crises like the COVID-19 pandemic are pushing scholarly publishers to make strategic decisions and launch new journal initiatives they may have planned over a few years in as little as a few months. There's a mounting sense that the clock is ticking to implement fully-OA publishing models and more digitally-driven publishing approaches to support widespread research discovery, linking, and reuse. Yet, with more questions than answers in the research landscape around what will be the most financially sustainable OA publishing options and how digital standards will evolve, most publishers are not in a position to radically shift their operations or financial models. In this climate of change, employing Agile methodologies, which originated in software development and have proven transferable in various industries ([Rigby et al.](#)), to develop projects iteratively can enable publishers to test new journal initiatives faster while avoiding the sunk cost fallacy ([Roth et al. 110](#)).

This white paper explores how operating with an Agile mindset has helped scholarly publishers respond to rapid change factors like COVID-19. It argues that publishers could leverage Agile principles in the long term to identify opportunities to sustainably adapt to the fast-evolving research landscape by experimenting with different digital and OA journal initiatives, adopting what works, and abandoning what doesn't.



Leveraging Agile methodologies also has the potential to further democratize scholarly publishing by enabling smaller academy-owned publishers to compete with their commercial counterparts more effectively, thereby leveling the proverbial "playing field" ("Scholastica").

The subsequent sections cover:

- How the pace of change in the scholarly communication ecosystem has increased, pushing publishers to become more readily adaptive
- An overview of the Agile methodology, including its genesis in software development and its applications in other industries
- Examples of journal publishers and stakeholders employing an Agile “organizational mindset” by using relevant Agile principles to pilot new initiatives with key takeaways

This paper aims to provide useful background on what Agile is as well as what it is not. As a technology development framework, the authors acknowledge limitations in applying pure Agile methodologies to scholarly publishing. While the Agile framework may not be entirely transferable to the publishing industry, this paper finds that adopting an Agile mindset and relevant Agile principles could help publishers more efficiently transition to digital-first operations and experiment with different OA approaches.

Accelerating change: The slow – then rapid – evolution of the publishing landscape



When Tim Berners-Lee unleashed the World Wide Web in 1989 ([World Wide Web Foundation](#)), academia appeared to be on the verge of a digital revolution that would not only alter the ways in which research is disseminated but also the equitability and sustainability of scholarly publishing. The launch of the first online-only peer-reviewed journal, *Postmodern Culture*, in 1990 ([Johns Hopkins University Press](#)) followed by the establishment of the first central online preprint server, the arXiv, in 1991 ([arXiv](#)) signaled widespread research digitization to come ([Roes](#)) and set in motion the genesis of the Open Access movement, marked by the signing of the Budapest Open Access Initiative in 2002 ([Chan et al.](#)). As the 2019 "Future of Scholarly Publishing and Scholarly Communication" report notes, the motives of the OA movement "are linked to the desire of making the fullest use of the possibilities opened up by computers and networks," to realize a future akin to H. G. Wells' world brain ([Directorate-General for Research and Innovation](#)).

Today, there is no doubt that progress has been made towards harnessing the potential of the internet to expand the reach and accessibility of scholarship. The 2018 STM Report finds "virtually all STM journals are now available online," ([Johnson et al.](#)) and the expansion of digital indexing and archiving since the 1990s has led to overwhelmingly digital-first research discovery practices via scholarly databases and, increasingly, general search engines ([Blankstein and Wolff-Eisenberg](#)). Recent industry analyses also point to growing OA adoption, including a 2018 large-scale analysis of the state of OA, which finds that "28% of all journal articles are freely available online [...] this proportion has been growing steadily over the last 20 years" ([Piwowar et al.](#)).

However, despite these advances, in many ways, the scholarly publishing industry remains on the precipice of transitioning to a digitally-driven and more open research future. While the recent estimate that around a third of all articles are freely available reflects OA growth ([Piwowar et al.](#)), it still means most scholarship is behind paywalls. Journal articles are also still predominantly produced in print-based PDF formats even though HTML is better suited to mobile reading and offers superior digital content linking capabilities ([Directorate-General for Research and Innovation](#)).

Additionally, interoperability between scholarly communication systems remains limited due to the need for more standardized metadata and data sharing practices, as exhibited by initiatives like Metadata 2020 ([Meadows](#)). As a result, many of the potential advantages of online publishing dating back to the 1990s, including faster communication of scientific findings, widespread research linking and data sharing, and lower production costs ([Roes](#)), are yet to be fully realized.

Since the early 2000s, questions have swirled around what it will take to reach a critical mass of the technology and stakeholder buy-in needed to shift the scholarly communication system to digital-first publishing methods ([Fitzpatrick](#)) and facilitate the development of viable OA models ([Open Science Initiative Working Group](#)). Discussions have centered around how to address the funding challenges of libraries as well as academy-owned publishers, as exhibited in the 2007 Ithaka report on "University Publishing In A Digital Age." The authors predicted funding limitations could hinder small publishers' ability to "compete effectively with commercial presses, to take risks with new business models, and even to have the bandwidth to think strategically and boldly about how to deal with the forces of change" ([Brown et al.](#)).

Brewing concerns over how to ensure the sustainability of academy-owned publishing like those raised in the 2007 Ithaka report have again bubbled up in recent years, following the introduction of new OA mandates ([Piwowar et al.](#)) and particularly the launch of Plan S in 2018 ([Schiltz](#)). In early Plan S feedback, both OASPA and ALPSP expressed support for the aims of the initiative to make research fully OA, but uncertainty about how small publishers with limited funding would be able to navigate such rapid change ([Redhead](#); [ALPSP](#)). These concerns have centered around not only the logistics of flipping subscription journals to OA models but also making existing OA journals Plan S compliant ([Frantsvåg and Strømme](#)). Due to the multiplier effect of co-authored papers, Plan S could influence 4%-5% of articles published ([Spilka](#)).

Few would have predicted that a mere two years after the launch of Plan S the scholarly publishing industry would also be navigating the COVID-19 pandemic. Like the Ebola and Zika epidemics before it, the climate crisis, and systemic social inequities coming to the fore, COVID-19 has magnified the need for more rapid vetting and publishing of scholarly articles and widespread research dissemination to respond to pressing global challenges ([Miller and Tsai](#)).

The pandemic is, of course, an extreme situation. But, in the wake of initial crisis responses, many publishers are finding that they can't simply return to business as usual. As Judy Luther, president and founder of Informed Strategies, noted during an interview in January 2021, "transformative changes are happening now in an economic landscape that is still unpredictable [...] what happens in higher ed is going to directly affect academic libraries and faculty who are members of scholarly societies, ultimately impacting publishing. The economic models that support OA content are also in flux [...] yet, the need and the benefit [of OA] are clearer now than ever before" ("History in the making").

“Transformative changes are happening now in an economic landscape that is still unpredictable...”

Judy Luther

President, Informed Strategies

Using evolutionary theory as a framework to analyze the scholarly publishing industry, Editorial Director of Journals Policy at Oxford University Press David Crotty likened the rapid changes occurring in the scholarly publishing landscape today to major geological events. Crotty argued these events are shifting the publishing ecosystem from gradual evolution to a period of punctuated equilibria, acknowledging that this more rapid rate of evolution is likely to be a “bumpy ride” (Spilka). Indeed, the most viable fully-OA journal funding routes remain unclear, and the financial effects of the pandemic within academia are yet to be determined (Brown; Radecki and Schonfeld).

However, recent events have also revealed the resilience of the academy and pushed publishers to become more responsive to changing scholarly communication needs. Publishers have risen to the challenge of COVID-19 by opening access to coronavirus-related research and data (Bobrov) and launching new rapid peer review frameworks and registered report initiatives, which many have been developing as they go (Hurst and Greaves; Brock).

In what the UN has coined the "Decade of Action," scholarly publishers are also increasingly committing to support the UN Sustainable Development Goals ([Taylor; United Nations](#)). As Jon Harle, Director of Programs at INASP, noted back in 2016, "these goals will inevitably require research to be published and made accessible to researchers across the globe" ([Harle](#)). And it appears that an exponential cross-stakeholder shift is underway to channel resources towards developing more open and equitable digital publishing practices.

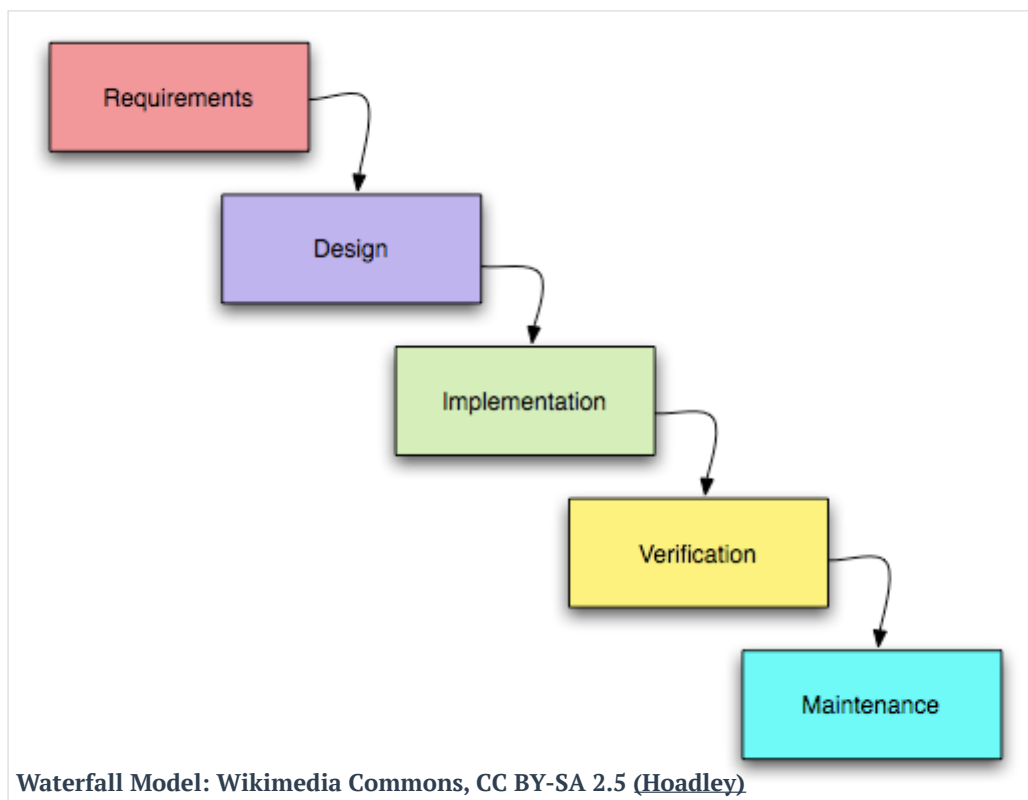
Efforts to build out metadata standards and interoperable scholarly communication infrastructure to simplify indexing and data sharing have accelerated ([Griffey et al.](#)) as stakeholders rally behind the call that "better metadata could help save the world" ([Meadows](#)). At the same time, more university libraries are increasingly committing to reallocating serials budgets to support academy-owned publishers and the development of financially-sustainable fully OA funding models to open access to research ([Wise and Estelle](#)). The launch of the first pilot transformative arrangements by small society publishers that participated in the Society Publishers Accelerating Open Access and Plan S Project (SPA-OPS) commissioned by Wellcome and UKRI are promising indications of a way forward ([Spiller](#)).

As exhibited by recent initiatives in response to COVID-19 and time-bound OA mandates, effectively navigating rapid industry changes requires iterative project planning, collaboration among stakeholders, and piloting different publishing approaches while developing them to allow for flexibility in the face of unknowns. All of these features are commonly attributed to the Agile methodology, which originated in software development and is now being embraced by various industries ([Rigby et al.](#)). As the rate of evolution in the scholarly publishing landscape continues to accelerate, there is an opportunity for publishers to apply the Agile mindset and principles many implemented in response to the pandemic long term to become more responsive to change and readily adaptive.

Introducing Agile: From software development to other industries

How can publishers begin to incorporate elements of the Agile methodology into project planning more formally? Before answering this question, it's important to establish a baseline understanding of what Agile is within its original context: software development.

Waterfall: the pre-Agile approach



Looking back to the 1980s and 1990s, the dominant way of building software fell under the category of "waterfall" project management, so called because of how the process was typically displayed as a series of project stages that each flowed down to the next one as it was completed, like water flowing down a stepped waterfall (Casteren). In waterfall development, a software team defines the scope of an entire application (or piece of software) upfront, estimates the time and resources needed to build it, and then works through every development step in a linear fashion to release a complete product to end users.

Benefits to the waterfall approach include:

- **Comprehensive planning:** Early waterfall product planning stages emphasize identifying, analyzing, and documenting what will be built to avoid costly late-stage changes. You can think of this as deciding to add a bathroom to a house before it's built so the plumbers lay the correct piping, versus deciding to add a bathroom near the end of construction, which can lead to expensive change orders and schedule delays.
- **Efficient division of labor:** In the waterfall approach, business stakeholders and/or customers define the desired outcomes for a software application in the early stages of its development, and then software developers write code based on those specifications. Each party completes their tasks (ideally) without the need for ongoing coordination or communication because there is detailed documentation to answer most questions.
- **Project predictability:** Once an application has been scoped out and all of the specs and documentation needed to build it are complete, the final product is easy to imagine. Schedules can also be projected with a relative amount of accuracy when the application requirements and scope are well defined.

However, despite waterfall development's various strengths, by the late 1990s, it was increasingly coming under scrutiny ([Bell and Thayer](#)). As internet norms and new technologies began to evolve more quickly, many software developers started finding that waterfall application planning was becoming too slow to meet customers' changing needs. By the time waterfall projects entered late-stage development, they could require substantial, and often costly, additions or updates to remain competitive — or worse, they might fall prey to the sunk cost fallacy ([Roth et al. 110](#)).

Among the primary challenges of waterfall project management identified were:

- **Documenting can be onerous:** Creating detailed documentation to anticipate all the behaviors a piece of software should support while also trying to ferret out unlikely-but-possible scenarios requires a lot of work. This means that documenting the expected product is a major cost center in a waterfall project — potentially more so than the developers actually writing code. For example, if you spent more time and money on the blueprints for your house than on the actual house itself, that might be alarming.

“New software engineering techniques are clearly needed to improve both the development and statement of requirements....”

T. E. Bell and T. A. Thayer

TRW Defense and Space Systems

- **Edge cases still happen:** It is almost impossible to anticipate every software contingency, so even with waterfall’s thorough planning phases, unexpected edge cases do pop up, generally during the final project verification/testing phase. This is a common source of frustration for teams working on waterfall projects — because having to make late-stage changes to an otherwise finished product can be costly and delay the entire product release timeline.
- **Changes are difficult:** If anything changes in the competitive landscape during software development that requires adding new features or information comes to light that necessitates overall product adjustments (e.g., customers express dissatisfaction in early feedback), altering waterfall plans can be challenging. Before initiating any product development changes, stakeholders have to make and agree on new documentation. And since each product development stage is dependent on previous ones in waterfall planning, proposed changes that might seem small can often have reverberating implications for the entire product.
- **Interpretations can differ:** During the verification/testing phase of waterfall development, it's not uncommon for a client/customer to start using a product and realize it's not what they expected or needed. Often, this is due to ambiguity in documentation or different assumptions that developers, customers, or the documentation writers each had. Such misunderstandings can, again, lead to costly product updates and frustrating release delays.

The rise of Agile

The year 2001 is often pointed to as the birth of Agile, a software development framework designed to address the pitfalls of the dominant waterfall method. While there had previously been Agile-like approaches, such as extreme programming (XP) and dynamic systems development method (DSDM) ([Abrahamssona et al.](#)), 2001 was when Agile project management principles became formalized. Seventeen software developers coined the Agile Manifesto ([Highsmith](#)), which features four key value statements:

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

Since then, Agile has grown to be the leading software development approach. The 14th Annual State of Agile Report (2020) finds that 95% of organizations use Agile development methods ([Digital AI](#)). And in a recent industry survey by HP, two-thirds of development and IT professionals report their organizations are either "pure Agile" or "leaning towards Agile," with only 9% reporting "pure waterfall" or "leaning towards waterfall" ([Jeremiah](#)). Today, many well-known technology companies develop software using Agile, including IBM and Cisco ([Cappelli and Tavis](#)).

The contrast between waterfall and Agile is stark. Agile emphasizes learning and adaptation over dogmatically following a plan, early delivery of functionality and value rather than delivery only when the entire project is complete, and frequent communication between team members and end users rather than static documentation.

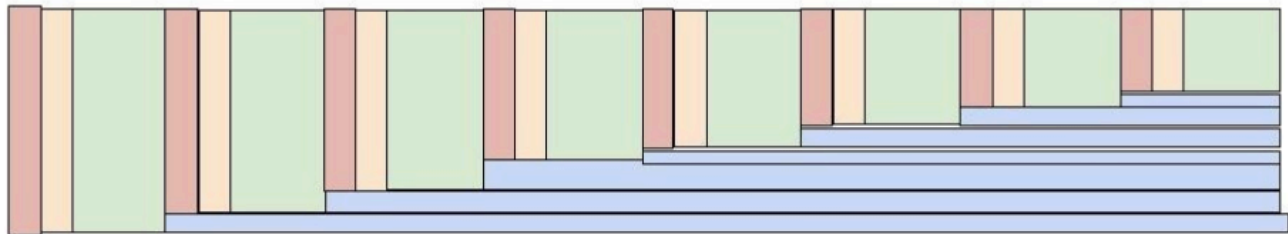
When software companies integrate Agile approaches into project management, the benefits they're commonly looking for include being able to:

- Deliver software faster
- Respond to changing priorities
- Increase productivity
- Better align IT and the business

Waterfall



Agile/Iterative



Waterfall vs Agile: Wikimedia Commons, CC BY-SA 4.0 [KSmith](#)

So how does Agile work day-to-day? Some of the most common Agile practices include:

- **Sprint:** A defined unit of development time that is normally four weeks or less with a defined goal — commonly, completing an entire feature.
- **Scrum/Standup:** A daily meeting, normally no longer than 15 minutes, where team members share what they did yesterday to contribute to the sprint goals, what they will do today to help meet the goals, and identify any blockers to progress.
- **Frequent releases:** Since each sprint goal generally involves producing a working feature, the opportunity to deploy code to users is available every sprint, or potentially even more often if multiple features are completed within a sprint. Many software companies release code at least every 4-6 sprints, and sometimes multiple times in a sprint. This allows teams to learn from user feedback, and adjust plans as needed.
- **Kanban:** A project management method where teams often use digital and/or physical cards or sticky notes organized in status columns to visualize the amount of work they have in progress and limit it. The Kanban method emphasizes that new work should not start until a sufficient amount of in-progress work is completed ([dos Santos et al.](#)).

There are many additional aspects of Agile specific to software development (e.g., continuous code integration, pair programming, automated testing, user stories, etc.) but those are more technical than this white paper aims to detail.

Many people initially experience Agile as software users. For example, if you one day found that a piece of cloud-based software you were using had new or updated functionality without a formal product “release,” that was likely due to the company using Agile development.

Agile adoption outside of software development

How has Agile been adopted by non-software companies? And can it be applied in publishing?

Since the mid-2000s, organizations in various industries, ranging from marketing departments to media outlets to wineries, have increasingly adopted Agile project management methods in whole or in part ([Rigby et al.](#)). For those interested in taking a deeper dive into how Agile has been integrated in other industries, here are some great examples to get started:

- An overview of Agile manufacturing (which pre-dates the same-named software movement) with a strong comparison/contrast to Agile software development ([Kettunen](#))
- A case study from Vistaprint's in-house advertising agency on using Agile to improve how their creative teams design traditional and digital campaigns ([Grabel and Dubovik](#))
- A primer on translating an Agile mindset and Agile project management principles to executive leadership ([Rigby et al.](#))
- Past Society for Scholarly Publishing industry sessions on Agile project management adoption at different information organizations ([Society for Scholarly Publishing](#))

It is important to remember that while scholarly publishers' main output is not software, their main product – scholarship – is, at its core, digital. The primary way researchers find scholarship is through digital metadata flowing to discovery services, and the primary preference for consuming content is in digital form (e.g., PDF, HTML, etc.), not physical (print) form ([Wolff-Eisenberg et al.](#)).

Scholarship exists on websites and in databases, and challenges around publishing more innovative forms of scholarship are often software challenges. For this reason, Agile is ultimately not as far removed from scholarly publishing as it might seem at first blush. And, as discussed in the background on Agile, while software is the primary product of Agile teams, the main principles of Agile are organizational — how to motivate people, how to prioritize, how to communicate, how to set goals, how to adjust and learn, how to maximize limited resources, etc. These aims are most definitely applicable to scholarly publishing.

The next section explores examples of how some small and medium publishers like the Electrochemical Society and UC Press are bringing a more Agile mindset into publication planning to test different publishing models while mitigating risk.

Agile in Scholarly Publishing: Causes and case studies



Waterfall has traditionally been the favored project management methodology in non-software industries ([Flahiff](#)), including scholarly publishing, with publishers often mapping out plans for new publications, content/workflow systems, and profit and loss statements years in advance ("[How UC Press](#)"). However, in the evolving research landscape, it's becoming more challenging to execute. As noted in the previous section, waterfall works best for time-bound initiatives where desired outcomes are known upfront. Today, as publishers strive to keep up with digital research trends, developing metadata-based publishing infrastructure, and new OA mandates, it's becoming harder to anticipate future publication needs and opportunities. Consequently, whether launching a journal or embarking on any variety of organizational updates, relying on front-loaded plans made years or even months in advance is becoming more of a liability than an asset in many cases.

The following case studies demonstrate how publishers across disciplines have begun applying more Agile organizational mindsets and project management principles in publication planning to respond to rapid industry changes from OA funder mandates to COVID-19. This paper uses "Agile mindset" to contrast with the formal software development methodology and to shift emphasis from the institutionalized practices used by technology companies/departments to the values and principles articulated in the Agile Manifesto ([Highsmith](#)).

Agile-minded OA model planning: ECS and the Microbiology Society

As noted, a question publishers across disciplines are grappling with is how to transition large portions — or potentially all — of their journals to fully-OA models in a financially sustainable way. While some publishers have surplus revenues they can channel towards large-scale OA experiments, smaller publishers with limited resources have to find ways to test OA options without putting too many eggs in one basket. Taking an Agile approach to piloting OA initiatives is one way small and medium publishers are mitigating risk.

An example of a small publisher implementing elements of Agile in business model planning is the Electrochemical Society. The society has been experimenting with OA since early 2014 as part of “Free the Science,” a working initiative to eventually flip all ECS journals to fully-OA models. In this endeavor, the society has embraced Agile principles of early and continuous product delivery and welcoming changing requirements. Beth Craanen, ECS' former Director of Publications, who is now Assistant Director of Editorial Services at the American Chemical Society, said ECS decided to test out low-cost APCs first as a way to begin quickly offering authors OA options. “We knew APCs could help us start moving in the direction of OA and open up other types of funding like library publishing agreements, so we led with that” (“[En route to fully-OA](#)”).

From there, the society began testing other possible funding approaches via a series of small-scale projects. “We began to build our article credits program, which we introduced as a way to get buy-in around the idea of OA publishing,” said Craanen. “Then we started to realize the importance of libraries and that we needed to avoid any double-dipping in our hybrid OA model. So we started thinking about transformative agreements [and ...] we developed what is essentially an early read and publish agreement where we took our existing digital library packages that institutions could subscribe to and created an add-on option called ECS Plus. We don't have a large enough team to negotiate every deal out there, so having this add-on approach [...] has been a lot more scalable for an organization of our size” (“[En route to fully-OA](#)”).

In the process of iteratively launching OA pilots, ECS has also adhered to the Agile principle of reflecting on project effectiveness at regular intervals, and the society has abandoned some initiatives early on as a result. For example, ECS started to explore a collective action funding model but decided to table that project upon determining other models had greater potential (“[En route to fully-OA](#)”).

When considering OA business model development, It's important to note that certain aspects, like composing Transformative Agreement (TA) contracts, are inherently not Agile because they require fixed terms over a set time period. However, some publishers are identifying opportunities to bring an Agile mindset into how they implement business model changes. For example, the Microbiology Society opted to approach its first Publish and Read package as a pilot initiative to either build upon or abandon. The society's Head of Business Development & Sales, Gaynor Redvers-Mutton, explained, “we wanted to make sure our TA was developed enough to start selling and in a workable phase whilst we assess options for the future. We try to march in step with Plan S and need to make changes to our TA approach based on policy and funder requirements” (“[Initiating transformative agreement](#)”).

In addition to approaching TA planning with change in mind, the Microbiology Society also employed elements of Agile project management in the creation of a TA toolkit as part of the SPA-OPS project. “We went through a few iterations to reach our final toolkit,” said Redvers-Mutton. “There were a few instances where we, as publishers, had to push to make sure the initial offer was feasible and something we could both deliver and build on. Given the scale of changes required, we realized early on that it would be much more efficient to launch these new models as pilots, with learning outcomes baked into the expectations, rather than over-promise” (“[Initiating transformative agreement](#)”). SPA-OPS’ prioritization of simplicity and “maximizing the amount of work not done” as well as its use of face-to-face stakeholder communication are all inherent to Agile.

“we realized early on that it would be much more efficient to launch these new models as pilots...”

Gaynor Redvers-Mutton

Head of Business Dev & Sales,
The Microbiology Society

Implementing Agile in new journal launches: UC Press and MIT Press

Another case where publishers are employing Agile project management principles in whole or in part is when launching new journals. While publishers have historically been able to map out journal plans years in advance using traditional peer review, production, and dissemination practices and subscription models, that is often less feasible when testing new digital or OA publishing approaches. Speaking to the challenges of front-loading journal planning, Director of Journals and Open Access at UC Press Erich van Rijn said, “we’ve learned a lot of that kind of effort can be wasted. It’s better to have a publishing infrastructure that supports standing up new products relatively quickly. You want to make investments in just the core areas needed to get something off the ground before putting too many eggs in that basket” (“[How UC Press](#)”).

UC Press has begun implementing Agile methods in its publication planning, including the launch of *Advances in Global Health*, an OA trans-disciplinary global health research journal. The publishing team initially planned to develop the journal similarly to past publications but changed course when the editors expressed a desire to frame it around the UN Sustainable Development Goals. “I don’t think that’s something anyone would have anticipated a year ago when our conversations about the journal started, but it’s a direction I see the industry beginning to move in [...] and obviously one well worth pursuing,” said van Rijn. “To realize their editorial vision, we know we’re going to have to make some adjustments to how we see the business model of the journal unfolding, so we’re working to not make too many assumptions” (“[How UC Press](#)”).

In line with Agile principles, the UC Press team plans to assess the performance of the journal early and often so they can pivot plans as needed. Speaking to the original software developers’ Agile manifesto, van Rijn said he feels the principle of building projects around “motivated individuals” is essential when taking an Agile approach to any journal launch. “You really need intelligent and committed people who are willing to iterate and change to succeed” (“[How UC Press](#)”).

One of the main challenges van Rijn sees to implementing Agile in publishing is finding tools and vendors that can support pilot initiatives. “Getting new products to market can take a long time because it often requires going through an RFP process [...] and, with the rate of change right now, by the time you get an idea off the ground, it may not be as relevant as you thought it was a few years before,” he explained (“[How UC Press](#)”).

When software is needed to support novel publishing projects or approaches, one way publishers can avoid lengthy RFPs is working directly with development teams able to iteratively build tools for them. For example, to launch *Rapid Reviews: COVID-19 (RR:C19)*, the first multi-disciplinary OA overlay journal for peer reviews of coronavirus preprints, MIT Press worked with the developers of PubPub, an experimental publishing platform launched at MIT that is now part of the Knowledge Futures Group. They were able to get the journal off the ground in about six months time, an unprecedented pace for most publishers (“[MIT Press Takes Agile Approach](#)”).

“We were stress testing [PubPub] with this project because the platform is not designed to publish peer reviews,” said MIT Press’ Director of Journals and Open Access Nick Lindsay. “I guess that was a fairly Agile mindset going in — we were okay with not having a complete solution and focused our initial efforts on just getting a sort of MVP version of the journal started to begin creating value. And we did end up breaking things, but the development team is so talented and has been able to work with us to find solutions” (“[MIT Press Takes Agile Approach](#)”).

Lindsay said that since the journal launch the UC Berkeley team, PubPub developers, and MIT Press team have all been meeting weekly to discuss any aspects of the platform that need to be updated so they can continue iteratively developing and releasing new preprint review and publishing options for the journal ("[MIT Press Takes Agile Approach](#)").

Instances of publishing teams working directly with software developers to build tools or platforms are among the closest examples of pure Agile in scholarly publishing. Though, it's important to emphasize that one of the core principles of Agile is that "Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely." As many small and medium publishers do not have dedicated software development teams or direct affiliations with software platforms, such pure Agile arrangements aren't necessarily always feasible or scalable.

“Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace...”

The Agile Manifesto

However, publishers can maximize their productivity by breaking up initiatives that require new software tools into smaller projects that can be handled individually. For example, in the process of launching *RR:C19*, MIT Press chose to work directly with the developers of PubPub to build new functionality into that platform where they knew they would be able to deliver working elements of the software needed within iterative sprints. Where they needed functionality that could not be built into PubPub in an Agile way, due to time or resource limitations, they sought existing software solutions they could add to their technology “stack.” One instance of this was partnering with Lawrence Livermore labs in Berkeley to use artificial intelligence that they had developed called COVID Scholar ("[MIT Press Takes Agile Approach](#)").

MIT Press' experience reflects the benefits of weighing the pros and cons of seeking "best-in-suite" versus "best-in-class" solutions when making software decisions, where the 'suite' (an all-in-one software solution) is contrasted with discrete applications ([Cody](#)). This type of decision-making can help publishers avoid situations where building significant infrastructure could result in the sunk-cost fallacy (i.e., it's not clear if an idea will be as valuable as was initially envisioned by the time it can conceivably be completed).

Agile publishing software development: eLife and Scholastica

Within the publishing industry, the way software platforms are developed, which has historically been waterfall based, is also beginning to change. In recent years, some platform providers have begun employing Agile methodologies to iteratively release software to end users and deliver value sooner. In this way, platforms can have shorter software evaluation cycles and pivot plans as needed to better support the changing needs of publishers and scholars.

For example, the technology arm of eLife has been taking an Agile approach to the development of Sciety, a platform for following new preprints and reviews of them via “Science Twitter” (“[Connecting Preprints to Reviews](#)”). The team’s initial aim was to create a publish, review, curate model platform for preprints ([Stern and O’Shea](#)). However, realizing that was going to be a major undertaking, they decided to break up the idea into a series of more manageable and “shippable” projects focusing first on the most pressing problem they sought to solve, creating a way to link preprints to peer reviews. They also opted to take an Agile development approach, releasing software functionality as it’s ready and getting user input in rapid feedback loops (“[Connecting Preprints to Reviews](#)”).

“To ensure we were building things people definitely wanted, we decided to really follow the ‘collaborate with users’ tenet of Agile development, in addition to working iteratively,” said eLife’s Head of Technology Paul Shannon. “It’s all about putting users first and really getting working software out rather than writing up lengthy documentation in advance” (“[Connecting Preprints to Reviews](#)”).

eLife’s Product Manager Hannah Drury said in her experience the most important aspect of and benefit to Agile software development is limiting the amount of assumptions made and software designed upfront. “Rather than a defined final software plan, we work on the basis of experiments,” Drury explained. “Each experiment has a hypothesis and then we run the experiment and review the outcome to see what we’ve learned and decide whether to carry on in the same direction or pivot and try something else” (“[Connecting Preprints to Reviews](#)”). The eLife team uses a variety of methods to evaluate their progress and pivot plans where needed, including gathering quantitative Google Analytics data and collecting qualitative feedback from current and potential users.

As a technology provider and the creator of this white paper, Scholastica also employs Agile methodologies to develop its products and services. Rather than building bespoke software, Scholastica continuously adds new features to its platform and makes them available to all users based on customer input and changes in the scholarly communication landscape. One example of this is how Scholastica iteratively added support for PubMed Central (PMC) indexing to its production service ("[How Scholastica](#)"). The team first started producing PMC-compliant full-text JATS XML article files that publishers could upload to PMC and then built the direct integration. "Breaking up that feature into shippable projects by focusing on the XML first — which itself is a series of smaller features around verifying the JATS and making improvements based on PMC's style guides — and then adding the front-end configuration for users enabled us to provide publishers value sooner. And, ultimately, I think it enabled us to build a better PMC integration," said Scholastica Chief Technology Officer Cory Schires.

To better support changing publisher needs, Scholastica's development team has also chosen to build out its platform modularly ([Cody](#)). Scholastica's peer review, production, and OA journal hosting software are developed separately and can be used individually or integrated. Taking a modular approach to software development has enabled Scholastica's team to quickly add new components or make adjustments to any of its products without affecting the other pieces. "Scholastica's modularity also enables customers to be selective about which of our software and services they choose to use," said Schires. "So publishers can prioritize 'best-in-class' or 'best-in-suite' solutions based on their needs."

Like eLife, by working in an Agile way, Scholastica's development team has found they can welcome new software requirements, even late in the development process, to respond to changing user needs. Scholastica's team also works in short software development cycles or "sprints" to more rapidly plan, design, develop, test, and evaluate software features.

Putting Agile into Practice: Key takeaways for publishers



As exhibited by the case studies in the previous section, publishers and publishing stakeholders can leverage Agile methodologies to pilot new projects more quickly and iteratively reach broader organizational goals. To successfully incorporate applicable elements of Agile into project management, it's perhaps most important for publishers to first focus on where and when Agile *can not* be applied to their journal programs. As noted, some aspects of publishing planning like developing Transformative Agreements or any other fixed-term contract are inherently not Agile. Trying to force-fit Agile methods into such initiatives is likely to muddle an organization's understanding of what Agile is and, consequently, its ability to properly employ Agile principles in initiatives where they can be directly applied.

From there, when considering the bigger picture of journal programs, publishers can work to find low-hanging fruit opportunities to implement Agile principles in project planning and start to harness the benefits. Among the areas publishers should focus on when identifying and executing Agile projects to select the best opportunities are:

Prioritizing early and continuous project delivery: To apply Agile methodologies to reach large-scale objectives, publishing teams must be able to conceivably flip the way they would have approached them in a waterfall manner. So, instead of scoping out all of the resources and steps needed upfront, teams must be able to break initiatives into discrete projects they have the resources to complete — in a working format — within set sprints of time. This will likely mean improvements feel smaller or more incremental, but they will also happen sooner and more frequently. If it's not possible to break an initiative into a series of separate projects because it has multiple dependencies (e.g., step A relies on step B also being complete), then it is not a candidate for Agile. Core to the Agile methodology is using working products or processes as a measure of progress.

Ensuring Agile projects can be sustainably developed: Another Agile tenet publishers should remain cognizant of is that Agile project management should "promote sustainable development," where teams can work towards larger goals at a constant pace for as long as it takes to reach them. That is not to say that Agile initiatives will not have deadlines.

Rather, the idea of sprint-based planning is to ensure that progress is being made towards larger goals at regular intervals by *completing working elements* of projects or processes and making them available to users at the end of each “sprint.” However, setting a hard deadline for work to stop on an initiative is generally not conducive to Agile planning since the idea of developing Agile products or processes is that they should continually evolve based on changing needs. Paul Shannon provided a helpful analogy from Agile software development, saying it’s “kind of like a garden in that you have to keep tending to it forever [...]” (“[Connecting Preprints to Reviews](#)”). As noted by Erich van Rijn, a key factor here is being willing to tolerate unknowns around the financial outcomes and scalability of new journals or business models early in development (“[How UC Press](#)”).

Welcoming changing requirements, even late in project development: Willingness to tolerate unknowns leads into the next core tenet of Agile for publishers to be mindful of — the idea of welcoming changing requirements even in the late stages of developing a new product or process. Following the previously mentioned Agile principle of “prioritizing early and continuous project delivery” will make this easier to achieve by making it possible to design, test, and iteratively improve upon working elements of new products or processes as they are developed. Since Agile project management does not involve mapping out entire initiatives upfront, as in the waterfall method, in theory, each part of an Agile project should be decoupled from the rest and possible to adjust as needed without dependencies. This enables organizations to learn as they go and come up with the best ideas for how to develop projects over time rather than having to think of everything at the beginning. Of course, an organization’s ability to successfully welcome and respond to change will rely on people as much, and perhaps more so, than project management processes, which leads to the next point.

Building projects around motivated individuals: While Agile teams may work in “sprints,” if one were to compare Agile to a race, it would be more akin to a marathon. Since Agile relies on working in continuous iterations to keep incrementally building projects/processes with rapid release and assessment cycles, it requires endurance and strong buy-in from all team members. Among the twelve principles of the original Agile Manifesto is to “build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.” The latter part of that statement about giving teams support and autonomy is essential to the literal agility of Agile, as too many tiers of management and checkpoints can lead to process bottlenecks that diminish the effectiveness of Agile planning. Whereas, when teams are able to guide project prioritization starting with the aspects they are most excited about, it generally leads to individuals becoming more motivated and completing work more quickly and effectively.

Regularly reflecting on project performance and making adjustments as needed:

There are a couple of levels of performance tracking necessary for any Agile initiative. Publishers should first be able to track that they are completing or “shipping” working components of the larger project or process they are developing at regular intervals. Next, they must also be able to track quantitative and qualitative data to assess the performance of the new project or process elements they are shipping as they go. This is essential to determining if and when to pivot plans, which, as noted, is part and parcel of Agile project management. As explained by Erich van Rijn “early in any project, you need to ask, ‘What type of data and feedback do we need to guide our planning, and how easy or difficult is that going to be to get?’” (“[How UC Press](#)”).

“Simplicity — the art of maximizing the amount of work not done — is essential.”

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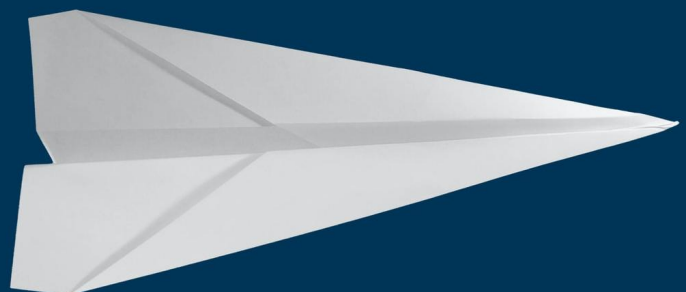
Prioritizing simplicity in projects above all else:

Finally, baked into all of the above is the core Agile tenet of prioritizing simplicity in projects above all else. The original Agile manifesto states, “Simplicity — the art of maximizing the amount of work not done — is essential.” The idea of “the amount of work not done” is key here — not only to ensure teams are working as efficiently as possible but also that the products/processes they are producing are as useful as possible. In software development, “feature bloat” is a common term used to describe building unnecessary functionality into a product, which can result in its core features being underdeveloped and/or the final product being harder to use. Similarly, Agile publishing teams should remain acutely aware of the essential elements of the products/processes they are developing and prioritize those areas above all else to avoid dragging out projects or overcomplicating them.

Closing

As the research landscape continues to evolve at an increasingly rapid pace, Agile project management principles are becoming more applicable to scholarly publishing. Applying an Agile mindset in publication planning where and when applicable is one way publishers can more effectively adjust their operations to account for external and internal factors of change affecting them as individual entities or as part of an organizational whole. For example, a scholarly society looking at its publishing arm in relation to its larger body could use Agile methods to identify ways to lower its journal production costs to help support the sustainability of the entire organization. Employing Agile project management principles to pilot new publishing initiatives can also help small publishers more effectively compete with larger commercial organizations while mitigating risks.

Pulling back more broadly, in this “decade of action,” when the United Nations is calling on all sectors to take steps to accelerate progress towards achieving the Sustainable Development Goals, the role of the academy in promoting global progress has never been more apparent ([Conrad](#)). There is a pressing need for scholarly publishers to expedite the vetting of critical research (as seen throughout the pandemic), open access to it, and support research discovery and linking via developing data standards. Implementing Agile methodologies could enable publishers to work with stakeholders to more rapidly experiment with and adopt new digitally-driven and OA publishing approaches to support innovation in all SDG areas furthering people and planet.



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