WT: Greating Flops Remixed

10 years working on "The Project"

Draft of March 24, 2020; submission date: April 30th 2020

Contents

1 Abstract: A MANIFEST for the paper:

- **Introduction**. We introduce the main problem that the paper will consider, namely how to learn 'anticipatory learning' methods. We introduce our Project and the writing style in this paper, along with AAR and CLA methods that we will use in our analysis.

- **Related work**. We survey several strategies for future thinking that were explored in the Futures Thinking course taught by Jane McGonigal. This material is interesting for us, because we can learn about how other people are learning to think about the future. This can provide a resource, and a comparison case for our peeragogical approach.

- **Story**. (If desired, we can include the story that we presented in Oslo. Actually, it would be useful to revisit the story again and see what new thinking we can hang off of the individual statements. This could help

us sharpen some of the questions we are interested in going into the Analysis section.)

- **Data**. Here we look back at our Project and try to learn from some of our failures in anticipation. What did we get wrong? What, if anything, did we get right? We use this to formulate the CLA.

- **Analysis**. We collect the themes surfaced in the Data section and refactor them using the Causal Layered Analysis tool. We also draw on the ideas from the Related Work to help expand both our data-surfacing and analysis.

- **Discussion**. We discuss the material above in connection with its broader historical context.

- **Future Work**. Resulting from all of this we outline some things we think will be valuable to do next.

2   Introduction: What is this paper about:

While sailing through the North West Passage we passed this mountain. The sun was setting and casting a red glow on the rocky cliffs. Surrounded by large white icebergs the entire scene was magical. I knew that I had to paint it. . . large!. . . `http: // bit. ly/ 39FYbkj`

Objective: Explain why the following material is relevant as a submission for *Futures*. **Status**: This section is mainly based on notes from a Writing Session discussion, 9 March 2020, between Charlotte, Charlie, Joe. It provides some themes, but it does not yet sum up the paper's argument. The section should therefore be reoutlined as an argument, reinterpreting the outline from MANIFEST in narrative terms. Part of our argument should be to connect with the earlier paper that Paola discussed, from *FUTURES*, to situate our work within an 'argumentative' context relative to other thinking about peer production.

In Oslo, we presented about how you can use peeragogy to learn *anticipatory learning*.

- Here's how in practical terms, we are approaching the experience of this conference.

- We can back that up by referring to some of the other conferences that we've been to and how did we learn from those.

- At least we're aware of what's going on in this project

We learned that people didn't want to be told what to do, but they wanted more agency. (Or were they just trying to be critical...?) But in fact we go to many kinds of events like this and often people are quite enthusiastic, and then we never hear from them again. Maybe we could get more granular with it and talk about the live events we've done. Kennedy, Texas, Oslo, PLoP, Harvard, Newcastle. Conferences are very peeragogical in general. People are out amongst the public. Opportunities arise, learning opportunities, e.g., we learned about CLA in Oslo. [E.g., parking lot example.]

Is Peeragogy a way to avoid the iceberg? Anticipatory learning is like, there might be an iceberg. Or there might not be one. But the potential is enough to work around or avoid?

So here are some of the icebergs that we've run up against in the past... e/merge...

But PLoP was pretty successful, we got shepherded, we got accepted, we met people like Takashi who bought our book. PLoP was mostly culturally like us, but however they were mostly software people. They have wanted to widen out their coverage, however they haven't necessarily made it widen out that much yet. They deal with Agile this and that.

By contrast it would appear that Roland's reading group was a huge success!

Maybe should have a Venn diagram of the different Four Letter Acronyms for thinking about the future, including the ones that have been discussed in this Reading Group.

Another successful live event was Howard's lecure in California, which scaled up our collaboration, or Wikimania 2010, which is where our collaboration got started. Over the years we have interacted with intersecting networks of friendly people, e.g., Claire put us in touch with Anticipation, and Claire and Joe met at an Andy Clark event, Joe has met other interesting people at other subsequent Andy Clark events (and so on).

Here, really practically, we could have a 'case study' about how to learn from people in conferences. Are we trying to think about thinking? Or are we trying to learn practical things? A peeragogical approach to writing our book might be to read other how-to handbooks and write about what we've learned about how to make a how-to handbook?

Charlotte: I was sitting at the peer learning conference, and someone came along to hear about how great it was to learn from your peers at Harvard, and they were like, what's that you have there! It was a copy of the Peeragogy Handbook. I wish I could have had 10 and just given them away.

This relates to the Historical Epochs part of the paper, because we've gone from needing a printing press in order to be a publisher to maybe just needing a computer. But places like Harvard still have something that people want, e.g., the cachet of a diploma. And, so, people who attend Harvard have the incentive to use whatever learning style you suggest that they should. In addition to the diploma, which matters a lot, is the people that you're around. Sometimes that's more or less valuable, but being around a group of focused, intelligent people elevates the hive mind (so of course there is some degree of peer learning going on at places like Harvard). And it was (Charlotte) very stimulating. But they also have to realize what they're like.

Roland: 'working at home doesn't work... or does it.' (Essay in Dutch.) Maybe everyone mentioned already spent time in an office and learned how to collaborate with each other, learned about the consequences of doing things incorrectly. Even from a business perspective we need to be investing in patterns beyond the software. The software platform is not the answer. One platform used well does sometimes improve things... like getting a critical mass. But the users need to be platform literate, otherwise it takes away from doing what you're on the platform to do ... they're learning 'platform' instead of learning the thing you're there to work on together. And in a collaborative writing setting, whatever platform you use, absolutely no one will do your editing for you. No one cares as much about your project as you do!

Charlotte: (As a publisher) I care about getting this stuff out.

Charlie: Maybe some remix of "the medium is the message", with platform – the platform is what you do? **E.g. learning how to publish a book by publishing a book, perfect example**. There's a whole thing about introducing a new platform or project and understanding how people react, there's value in understanding the reactions. "Release ourselves from our vow to our mediocrity..." How choosing a platform influences what you will or won't learn. If someone introduces a new platform, what if we spent 6 weeks on X and it didn't go anywhere? Free software debate we've had drives some people away, for others it's part of an echo chamber...

Example of the music guy, Charlotte, recognising his pain, he was excited about having someone who cared. We might not understand it... but it's about the way kids learn music and language.

5

By and large in this project we seem to get it (even if we're sometimes a bit slow, like we didn't do a Reading Group for years)... but with conferences and grants, we're often not on same page, we're not even in the same book.

2.0.1 Themes, Wishes, Epigrams

- **Joe**: In "Baudrillard's Bestiary", a clever idea from Marx about how firms controlled by shares are a step towards more co-operative organizations.

- **Chris**: Suma, a whole foods producer – they have a very flat structure, same payments, rotational thing in the staff canteen. Practice - Sociocracy as their management methodology. Also use Co-op university as an example (their work "looking forward" from the past).

- **Ray** has gathered some leads pointing towards a better literature review

- **Paola** remarked on a kind of cultural imperialism in a paper from Bauwens and colleagues in *Futures* that would help give this paper a critical edge.

- **Joe**: a couple of recent proposals not copied in here currently but which could be good to summarize as relevant 'future work', viz., Peeragogical Pathways, and Peeragogical Innovations. (Happy to include contents here if relevant.)

- **Roland**: Doing interesting futures studies work in his reading group.

- **Joe**: We could use the "Indeterminate Futures" call that I found as a pre-seeded literature review of some related themes.

- **Charlotte:** Practical groups/projects in non-academic fields - rowing clubs, community media centers, etc. Best practices, how to start, sustainability, projects within the meta-org, etc.

- **Melanie:** Melanie has interests in both food production and distribution, and in navigating complicated project archives. Maybe she can contribute some paragraphs to this paper on these themes?

- **Robert:** Has talked about a tool for making information flow between different systems. That would be tremendously useful for our distributed Project.

- **Everyone:** Since we're now thinking a lot about Covid-19, a reasonable question is how to be resilient to future shocks.

- **Tanya Leighton** In The Poem About Love You Don't Write The Word Love

- **Mad Max: Fury Road**: "Where must we go, we who wander this wasteland, in search of our better selves."

- **Marcel Broodthaers**: "I do believe that I am now able to express myself on the edge of things, where the world of visual arts and the world of poetry might eventually, I wouldn't say meet, but at the frontier where they part."

2.0.2   OTESSA Reviews: Some stops on our roadmap?

- The proceedings are clear and well organized. Considerable material has been redacted, indicating author(s) are **relying heavily on self-referencing**. They might consider expanding the review to look at parallel approaches to informal learning adopted in formal learning, such as Open Space Technologies or others to indicate how the proposed practice is situated – what gap it fills – what it offers- more clearly. A general revision for flow is needed.

- Defining a means of measuring peer learning compared to participant expectations has a lot of potential, especially considering the rise in interest in self-directed learning, lifelong learning, and continuing eduction. The proposal would **benefit from a more systematic and thorough review of literature on peer learning**, rather than drawing on Wikipedia references. It would also benefit from a clearer explanation of the relationship between **informal peer learning and the references to failure**. Do the authors propose that productive learning opportunities exist through a structured reflection on past failures with others? The analysis section of the proposal should focus on the approach to the analysis, rather than a list of what was analyzed. *The proposal does not address the protocols used to to obtain research ethics approval from a board, if applicable.*

- While I agree with the sentiment that **academics** ought to formally share both successes and failures, this proposal seems to be simply a list of 'rejected papers, unfunded proposals, and aborted missions' **without a coherent narrative** to bring them together. Perhaps

7

there is a narrative in the list, but it is, unfortunately, not evident here. Also concerning is the apparent reliance on self-references, bolstered by **Wikipedia**.

3 Related work

Objective: Make sure that it is clear that we meet this criterion: "Articles submitted for publication in *FUTURES* must show awareness of the futures field and make an original contribution to the advancement of knowledge in Futures Studies (which includes Anticipation Studies)." **Status**: We primarily lift the Pattern Catalogue that Roland has been developing, which draws from Jane McGonigal's course. Roland's wiki is a more authoritative version than the quick processing job I did here. He also includes pointers to upstream sources from which we might be able to get actual references for these. This gives a big boost to our survey, but we will also want to explain how we use this material, and why it constitutes an original contribution.

- Pattern 1: **Drivers**. Social, Technological, Economic, Environmental, and Policy drivers (STEEP)

- Pattern 2: **Forecasts**. Volatile, Uncertain, Complex, and Ambiguous (VUCA)

- Pattern 2a: **Signals**.

  1. What change does it present, from what to what?
  2. What is driving the change,
  3. How will the world look like if this becomes widespread?
  4. Does this future alarm us or make us happy?

- Pattern 3: **Four Square**. Negative vs positive, powerful vs disempowered.

- Pattern 4: **Simulation**. Predict the Past, Remember the Future, Hard empathy (how to unstick the mind when you are paralyzed by pessimism about the future and the feeling you cannot change it)

- Pattern 5: **Four archetypal structures**

  1. Growth: things continue and advance in a smooth way

2. Constraint: something imposes itself which puts a constraint on things, such as a necessary adaption to climate change, or a new purpose makes adaption necessary, such a widespread concern about extreme inequality.

3. Collapse: things break down and we've to survive.

4. Transformation: something massive changes and makes new things possible.

- Pattern 6: **Full Body Experience**

  1. Setting: the high level topic, such as the future of New York City, the future of VR etc

  2. Scenario: a story about your world in a specific year in the future

  3. Situation: a moment, an artefact that communicates effectively. Embodiment. A marriage in that world for instance.

  4. Stuff: what is on the table, what are the objects. How can you show what does not yet exist?

- Pattern 6a: **Full Body Storytelling**

  1. Don't break the Universe: keep the scenario logical and coherent

  2. Snake-dog leash: you cannot create a snake dog hybrid, but you can show a leash for a snake dag.

  3. Future jamming: take advertisements or other media existing today in a future context. Tourism poster for Mars, cigarettes pack scrubbing lungs against cancer.

  4. 5/50/500: if people only have 5 seconds attention, give them something for that time, if they want to explore further, give them that content too.

- Pattern 7: **Massively Multiplayer Forecasting Games**

- Pattern 8: **Futures Wheel**

4 Story: A Fictional Peeragogical Anticipatory Learning Exploration

Objective: This situates our work relative to the Anticipation theme. Make sure we address this criterion: we talk about *emanated from the event, perhaps with further development.* The conference itself curated the papers in a

number of thematic questions, so we explain more here about which of these themes we addressed. At a narrative level, it will be interesting to look at "questions that we had after the event". **Status**: This contains the script that we produced, but it doesn't yet contain Charlie's follow up notes on the experience, which I think might contain a PAR for the event. This should be added, to make this section into a "launch pad" for the rest of the paper.

We are working on version 4 of the Peeragogy Handbook here: `https://bit.ly/2OpfVZG`. The following is a warm-up exercise. We invite you to send your feedback and to share your experiences with peer learning!

Here, a group of peers practice anticipatory learning together, drawing on their experience in peeragogical learning environments. Peeragogy is their method for active learning with colleagues, a term to describe how people generate, exchange, negotiate, and apply knowledge together. The goal of anticipatory learning "is not to be well adapted but to adapt well" (*Downing 2007, quoted in Tschakert and Dietrich, 2010*). These peers work towards that goal peeragogically in a work of design fiction grounded in the present, but beginning to explore a possible future of learning.

4.1   Roles

Narrator
    Wise Woman
    Peer A
    Peer B
    Peer C
    Peer D

4.2   Story

Narrator: In a room walled by full bookcases and dotted with lush plants, a wise woman sat facing a group of her peers and said:

Wise Woman: "I brought you here to reflect on our work together, to think about what anticipatory learning is, and try to understand how it happens."

Peer A: "Well, let's see how it relates to what we've learned about peer learning," "We've been exploring the value of interaction and the new connections it brings. We all learned at an early age, that $1 + 1 = 2$. But when we collaborate, we sometimes find that $1 + 1 = 3$ or $1 + 1 = 4$."

Wise Woman: "Would one of you mind going over that math again, please?"

Peer B: "Take two people and a couch. Individually they cannot move the couch on their own. Only when they work together can they move the couch. So, when you have two people who work well together, you have the benefit of both of their talents separately and you have the benefit (plus alpha) of things that they can do together that they could never do on their own. In a very real sense, $1 + 1 = 3$ or $= 4$ or, even, $= 5$."

Wise Woman: "Takk!"

Peer B: "You're welcome! We can't measure the value of collaboration with a yardstick, nor can we be sure in advance what we're going to get out of it, but on a whole we see tangible benefits from working together."

Peer D: "At my university, when someone asks a question, or helps with a problem that needs to be solved, usually a very complex one, they address their email to the group 'Dear Hive Mind'. It is a phrase to define collective intelligence, the ability to think together or ask for help," "—and it means we can achieve desirable outcomes that may be impossible otherwise, leapfrogging hierarchical processes."

Peer A: "And let's not forget that this is an embodied process," "Recall Owen:[1]

- 'Whoever comes are the right people',

- 'Whenever it starts is the right time',

- 'Whatever happens is the only thing that could have', and

- 'When it's over it's over'.

"In our work, people have come and gone, and sometimes they have come back again. Similarly, any edit made to our shared work is probably an improvement, or at least we trust that it aims to be one. So ideally we will learn something from each change that takes place."

Peer C: "I am reminded of a Serendipitous Learning Roundtable that I participated in years ago.[2] I have reconnected with individuals from that roundtable to complete multiple projects. It is often not until a new round of introductions are made that we remember that we know each other because of our participation in that original serendipitous event. When we prepare to learn, we must be ready to expect the unexpected."

Wise Woman: "I have another question. How are we to better learn today for sustainable tomorrows?"

---

[1]Owen (1992)

[2]Wilkoff (2014)

Peer B: "Can we make a roadmap?"

Peer D: "I'm not so sure. Perhaps the idea of a roadmap, even a 'distributed' or 'emergent' one, is too prescriptive in this case."

Peer B: "Actually, I think a roadmap is a good start for every project. It makes clear the initial visions, expectations and commitments of the group. At the same time, it must be adaptable and open to new and previously unforeseeable paths. Learning is not a linear process, and it doesn't happen in a vacuum. Our goal is to build a deeper understanding of situations that were not visible or clear at the beginning. That involves looking forward as well as looking backward."

Peer A: "OK, but maybe it's not a roadmap anymore. Perhaps it's a story."

Wise Woman: "Interesting. How about this one: What lessons should we not repeat and how so?"

Peer B: "We should stop recreating the wheel."

Peer D: "There are indeed lots of resources out there, and much to be gained by bringing together people with different perspectives and backgrounds. This can help ensure that nothing is missed."

Peer C: "It seems like we are continually working out how to do this more effectively. In principle, there's no limit to what humans can achieve. In practice, there are lots of problems in the world. What's our specific contribution?"

Peer A: "I think enlightened self interest can be an effective glue, whether it's about personal satisfaction or group survival. So one specific thing we can do is work to create dialogues between parties who are seriously concerned about particular problems, so we all learn from each other."

Peer B: "We can't beat evolution, so let's join it!"

Wise Woman: "How does this relate to the themes of learning through informal, provocative, and unexpected practices, and by 'hacking'?

Peer D: "A continually revised guide book is one hack for this process. Maybe it's unavoidable that keeping it up to date and improving it is a difficult and time consuming endeavor, but the good news is that this work has many rewards, as we've seen with our 'Peeragogy Handbook'.[3]"

Wise Woman: "It seems that the bonds of friendship are what have made this project sustainable over the long term. We created a space where we take some risks, and thereby, learn together. Extending that safe space and these connections will enable more people to practice, learn, and adapt together."

---

[3] Peeragogy Handbook (2016)

4.3 References

1. Downing, T. 2007. *Adapting to Climate Change: Achieving Increased Resilience and Livelihood Improvements.* Panel Discussion, Forest Day, December 8, 2007, Nusa Dua, Bali.

2. Owen, H. (1992) *Open Space Technology: A User's Guide.* Potomac, MD: Abbott Pub.

3. *Peeragogy Handbook* (2016). Peeragogy.org.

4. Tschakert, P., and K. A. Dietrich. 2010. *Anticipatory learning for climate change adaptation and resilience. Ecology and Society* 15(2):11. online URL: http://www.ecologyandsociety.org/vol15/iss2/art11/

5. Wilkoff, B. (2014, July 23). *Project Roundtable: How does Serendipity Play a Role in the Learning of Students, Teachers and Learners?* Video File. Retrieved from https://www.youtube.com/watch?v=OKUOwEC4FjM

5 Data: Greatest Flops Remixed

ABSTRACT. How can informal learning endeavors reflect on what they have accomplished? What lessons learned can they take to improve future learnings? We introduce a methodology here that others can leverage for informal learning review using two lenses. First, the "Paragogical Action Review," which we developed based on the well-known After Action Review in 2012, and which we present here in a revised form. This prepares for an analysis of the project in the following section.

1. Introduction Why are these flops? There is an interface. So what about a followup, or a follow-up to a follow-up, so that something could emerge?

   Is the conference the best setting to do that? What if people decide at a conference you have to ask questions, but then they just go home.

   This fairly often happens at conference. But we do all have local, regional, and global interactions that last much longer. In the peeragogy project we have lots of flops, but don't underestimate the fact that the community is still going. Even if the flops are at the interface, there are interfaces, new people come along, people come back. Maybe what we learned is that here's what goes on. Conferences are good for meeting

people you know already, or who have explicitly common interest. So who do we stay in touch with (e.g., Charlie).

Or in the case of editors, think about it in editorial terms. Here we have an account of interactions! Why did they not consider this thing as a suitable publication? It might not be as simple as "this was a lousy job". Maybe the goals didn't align. It may also be, we learned these things don't align. So, this is how we figured it out. Not just the goals, but also the resources in the case of Kickstarter.

NSF might only fund a small percentage of a big project. You don't want to stop doing the actual studies, whether there's money or not. Maybe one of the employees will just manage crowd-funding. Or a programmer who does the product. Most companies would have a separate finance office. On Kickstarter you might have fly-by-night operations, but if you can have a proven record, you could have a sustained innovation process. Maybe project X is only step 5 of 10, but we want to then prove our track record to start to get a track record.

In formal learning environments such as a course at a university there is a formal process for review and gathering lessons learned following a course to improve the next one. Many schools have the students take surveys near the end of a course to reflect on how it went relative to their expectations. The results are used by faculty and administrators to analyze how it went and possibly make tweaks in the future. In informal learning environments there often are no classes, teachers and/or administrators. How can those endeavors reflect on what they have accomplished? What learned lessons can they take to improve future learnings?

We propose a methodology combining two lenses: the "Paragogical Action Review", a reforged version of the US Army's After Action Review, and Sohail Inayatullah's Causal Layered Analysis. To illustrate we will analyze our own work in the Peeragogy Project, which was kicked off by Howard Rheingold's 2012 University of California Regents Lecture, "Toward Peeragogy". One goal was to make peer learning a universally viable alternative to formal learning. That has not yet occurred and to help understand why, we gathered an archive of rejected papers, unfunded proposals, and aborted missions,[4] which we analyze using the methodology and in the process surface emergent themes and diagnose

---

[4] http://bit.ly/2XrFoEn

trends.

Ethics. Our edge seems to be: radical openness, learning from everything, without striving for control. In particular, embracing failure is an ethical stance. We take inspiration from Melanie Stefan (2010) and others who've published a "CV of failures". Science itself benefits from sharing negative findings (Nature, 2017).

Access. Going beyond simply releasing material under a suitable license, a free/open production model benefits from a free/open critical discourse. Techniques like PAR and CLA can help us extract meaningful signals for further remixing.

Futures. Methodologically, in this paper we have shown how PAR can complement CLA, a prominent technique for imagining futures. Thanks in part to our collaborative work, scholarship and practical experiments with paragogy, peeragogy, and 'hybrid pedagogy' have flourished (Mulholland, 2019). Nevertheless, there is much more to do to build a rich, accessible, knowledge economy: and this will be important for everyone's future (Unger, 2019a, 2019b).

We draw from 6+ years of interactions in the Peeragogy project of interest to others concerned with collaboration and social welfare.

5.1   Paragogical Action Review

The Paragogical Action Review is based on the After Action Review used in military and businesses contexts (Wikipedia, 2019a), but adapted around paragogical principles (Corneli & Danoff, 2011). We will apply the following rubric retrospectively, using the present tense to time travel into the frame:

1. Review the intention: what do we expect to learn or make together?

2. Establish what is happening: what and how are we learning?

3. What are some different perspectives on what's happening?

4. What did we learn or change?

5. What else should we change going forward?

1. **PEERAGOGY.EDU**

    (a) We want to run a MOOC to codesign a peeragogy-based university: peeragogy.edu.

(b) We develop an *outline syllabus* and budget, and pitch to the Knight Foundation.

(c) The details of the syllabus are meant to be worked out with students when they arrive, which is somewhat confusing; the tasks and budget are more concrete.

(d) We have a budget breakdown for $50,000.

(e) We should rework the syllabus around the target audience—possibly in a classroom rather than a MOOC.

2. **The Economics of Peeragogy**

(a) Could we fund our MOOC on Kickstarter?

(b) We juggle the numbers, and get feedback from Kio Stark, who successfully crowdfunded her book, *Don't Go Back to School*. She cautions: "on Kickstarter—if people don't immediately get what it is, they're not likely to stick around long enough for the explanation."

(c) Fabrizio Terzi, peeragogue, suggests that we include time donations alongside monetary donations. We juggle numbers some more.

(d) We have started to describe a value proposition.

(e) Kio tells us Kickstarter is a full-time job: proceed with caution.

3. **The Paragogical Action Review**

(a) We facilitate an online workshop on "Paragogy and Ubuntu." It doesn't go well. We want to understand why.

(b) Participants have trouble installing open source software Mumble. There is little activity on the shared Etherpad.

(c) We discuss trade-offs between community and individual projects. Conference organizers suggest a "good outcome" is just increased awareness of paragogy.

(d) We strengthen our shared skills at working with risk by devising the PAR.

(e) We hope to establish a distributed "mutual aid society"—but we need to work harder to make sure that it's really mutual.

4. **Patterns of Peeragogy IEG**

(a) We bid for an Individual Engagement Grant to support engagement with the Wikimedia community.

(b) We propose to catalogue patterns of peer learning on Wikimedia sites. We get feedback Asking for more examples and clearer benefits.

(c) Our breakdown of tasks and deliverables is fairly precise, but doesn't add up to an obvious "must have".

(d) We get really into design patterns!

(e) Could we draw on Corneli et al. (2015) in a proposal that clearly addresses the Foundation's priorities? Could we improve our pattern writing workflow with a federated wiki, per Cunningham and Mehaffy (2013)?

5. **CHOOSE YOUR OWN PEERAGOGICAL FORTUNE**

(a) We prepare a submission for the 2018 Connected Learning Summit.

(b) We have a dialogue about the "what's next" steps from our pattern catalogue, asking what makes the Peeragogy project a sustainable learning community.

(c) At the last minute, we realize we need to anonymize the paper. The content is too much about "us" to stand up well to those changes.

(d) We subsequently revise the text into a successful submission for Anticipation 2019.

(e) We can review work that was accepted for CLS.

6. **Flops (OTESSA)**

(a) We wanted to analysis of our experiences in the project and share them in an education context.

(b)

(c)

(d)

(e)

7. **Techno (SANTA FE)**

(a)

    (b)

    (c)

    (d)

    (e)

8. **Pathways (NESTA)**

    (a)

    (b)

    (c)

    (d)

    (e)

9. **Innovations (TUFTS)**

    (a)

    (b)

    (c)

    (d)

    (e)

5.2 *Chat about latest parts of that sequence:*

JC: Somewhat bittersweet about Tufts E.C.: it's good that we tried. Maybe the long list of failures suggests we're "ahead of our time?"

    PR: I like that reading, but at the same time, I think we need to make a bigger effort to identify our blind spots.

    JC: Quick google on this:[5] I wonder if we can link to Paola's earlier remarks about *cultural imperialism* of "P2P" that ignores global south. . . [6]

6 Analysis: Causal Layered Analysis

Causal Layered Analysis a method for envisioning transformation introduced by the **futurologist Sohail Inayatullah**. We learned about it at the Anticipation 2019 conference.

---

[5]http://nautil.us/issue/28/2050/why-futurism-has-a-cultural-blindspot.

[6]https://www.kcl.ac.uk/futurology-the-visionaries-who-predicted-todays-world

As an illustrative example we will use the technique to evaluate our work the Peeragogy Project, an informal learning community convened by media scholar Howard Rheingold in 2012, who intended to create resources for "*for any group of people who want to learn anything.*" However, the project has yet to fully accomplish that goal. To help understand why, we examine the project's "Greatest Flops", including rejected papers, unfunded proposals, and aborted missions. Every project will have some of these: since the aim of the Peeragogy Project is to be explicit about how learning works, it makes senders to investigate how to learn from failures. We demonstrate how using these methods together can surface emergent themes and diagnose trends. We then discuss these in relation to the sub-themes of this year's OTESSA conference: Ethics, Access, and Futures.

(Source:[7])

We look back over the PARs and attempt a synthesis that can "make synchronized changes at all levels to create a coherent new future" (Wikipedia, 2019b). At each level we compare the current reality with the future reality hinted at above. The definition of anticipatory learning is to think about what future failures could occur. (Though we can modify to include successes!)

EXAMPLE: Parking lot planning, domino effect of road capacity.

6.1 The litany - the tip of the iceberg, recent trends, what we see in the newspaper

Inside the peeragogy project we track things like meetings, patterns, handbook editions and purchases; papers, citations, and proposals. Quantitative trends are easily analysed, but how do we measure, e.g., whether our patterns are actually useful [1]? We are claiming that peeragogy is somehow relevant to things like citizen science, Stack Exchange, regular science, the gig/app economy. What we're doing should be relevant somewhere. We see things about Open Access (even Elsevier is into Open Access if you pay them enough money). Meetups are frequently available in cities. Even television ads now talk about MOOCs. If you can do everything from the comfort of your Peleton with an iPad attached, maybe we don't need much more. But do we want to reproduce the standard pedagogy? Would this be like building a car where instead of a steering wheel, we have reins? If people are sitting on their exercise bikes, or in the MOOCs, do we want to replicate standard classes? Maybe I don't need an instructor. Maybe I can chat with someone

---

[7]`http://www.danoff.org/Action-and-Change-in-Peer-Learning-UIC-Research-Day-Feb-2020.pdf`

else. How is what we're doing relevant for these people? Or, maybe they don't have the idea yet, some discussions about this stuff could spark ideas. You could do a simulacrum of a gym, but you could also ride through a park with your 5 friends.

6.2 Social causes - just below the water, trends from the last decade, investments, educational programmes

Our aim with 'paragogy' was to use peer learning to build better support for peer learning (Corneli & Danoff, 2011). Are we successfully inventing ways of relating that address the needs of people with limited access to educational opportunity? Can we extract patterns from the literature on MOOCS, crowdfunding [2,3] and other collaborative projects that can be applied here? Even if we try to close the access gap, inequality is still a problem (access to internet, language barriers, cultural differences, time constrains, labor conditions, etc.)

With the app economy, people have started to think about how to unionize. This comes up also with academia, where people might spend more time in their cars commuting between jobs than they do in the classroom, this is something that they might want to think about. On the other hand, if this becomes virtualized, then teaching 3 online classes might take less time than commuting and teaching two adjunct jobs. You might not have a MOOC about QFT, but you could have a small, high-quality, one that students get a lot out of.

With a breakdown of economies into blue/red economies, the fact that we sort of speak the same language is no longer that relevant. This has to with social mobility. Right-wing and left-wing radio are talking about different realities. You could go months and months without tuning into something that matched the reality that you're used to. How could we bridge between the different contradictory realities (e.g., plastic bags are good for health, but bad for environment, etc.). With health, or public health at the level of the city, you're trying to oppose entropy and natural selection. You can do that, but this will cost you dearly. With a tomato wrapped in plastic, you're trying to make a high entropy state of zero germs. In order to maintain this unlikely thing, this is energetically expensive. This is really the same thing with health. This is also the case in terms of opposing evolution. The ordinary thing is that virus that is too infectious go extinct because it kills the host too fast, and by the same token the host that is too susceptible goes extinct. (Model as Lotka-Voltera system, and look Fisher fundamental theories of selection here.) Over the last century, we had lots of people who

actually wanted to accelerate evolution – not just Nazis, but also people involved with the Scopes Monkey trial. (Darwin and Social Darwinism, this continues into the 2020 US election.)

But where does peeragogy come from in all this? How do we organize forms of evolution that are somewhat hierarchical – bees have somewhat peer-to-peer signaling but they also have hierarchy with their body types and their breakdown of labour.

Or, let's say we have the debate about whether to ban the plastic bags – how do we get to the level where all the relevant things are taken into account? Doctors will say keep them, environmentalists will say ban them. How can we have a constructive discussion – bringing in economics for example. These things are **complex** enough, MAYBE ONLY PEER LEARNING IS ABLE TO KEEP UP. Reference to Sloterdijk. Or other ways of entering a design space (e.g., biodegradable plastic that should make everyone happy). But unless you bring in a chemist you might not get to such a solution.

Collaboration can happen easily enough in small world networks, e.g., in a rowing club everyone is is literally in the same boat. How do you collaborate across different arbitrage opportunities? How can you up to different levels? This is where signalling comes from.

As opposed to things like Ford where you'd be there forever, you'd have small groups, iterating quickly. In scientific literature and collaboration you might have people working in a given lab: they work within a lab, but they also write papers that other people read. They get together at conferences, and if they have a need then they use their network to bring in someone else. In the company setting, is there a kind of commons? In science there's a kind of protected commons. In Monbiot's breakdown, maybe a commons is needed. If you're just working in a firm, you get into limitations – but there could be a way out by bringing in the commons. You go outside of the firm. If you have a commons of information/skills/knowledge you could still have your small firms, but there would be ways for them to work together. A kind of slush that can organize as needed. The free market is meant to be as slushy as possible. If the market is running right, no one has monopoly power, they all have to compete.

If a population gets too big, you get to a point where you crowd out the environment and that doesn't work. Or if it is too small you can't innovate. Historical circumstances like guerrilla/militia armies vs centralised ones. Fast response from a highly organized and highly specialized system. If you have something like a duck, this has to deal with a more complex arrangement. If you had fast cars without the communication network that they interact on, they won't go anywhere.

Robustness curves. Very narrow distribution for a specialist, a bigger one for a generalist. If you're able to add the specialists and they don't cancel each other. How would different committees compare, e.g., depending on the proportion of experts? (Reminiscent of Lisa's jury duty story.) People with an overlap could have meaningful discussions.

6.3 Structure - worldview, e.g., different in the far east from the 'western' individualism, and many other cultures

There are a bunch of innovative learning experiments going on, but it can be hard to get a good overview, and access is very uneven.

Can we develop our strategy for translating our learning within the Peeragogy project to (and from) diverse audiences?

6.4 Metaphor and myth - more abstract, e.g., belief in a messiah, or belief in ancestor's spirits; this is the biggest part of the iceberg

People often talk about great men and women, neglecting peers and networks.

We should nevertheless keep the Iron Law of Oligarchy in mind as an attractor in peer production (Shaw & Hill, 2014)!

We can borrow a technique from religious studies (Batchelor, 2015), and ask, how does Peeragogy differ from other approaches?

6.5 References

1. Batchelor, Stephen. *After Buddhism: Rethinking the dharma for a secular age.* Yale University Press, 2015.

2. Corneli, Joseph, and Charles Jeffrey Danoff. "Paragogy." *OKCon.* 2011.

3. J. Corneli, C. J. Danoff, C. Pierce, P. Ricaurte, and L. Snow MacDonald. "Patterns of Peeragogy." In *Pattern Languages of Programs Conference 2015, Pittsburgh, PA, USA, October 24-26, 2015.* Ed. by F. Correia. ACM, 2015.

4. ˜ ˜ ., eds. *The Peeragogy Handbook.* 3rd ed. Chicago, IL./Somerville, MA.: PubDomEd/Pierce Press, 2016.

5. Cunningham, Ward, and Michael W. Mehaffy. "Wiki as pattern language." *Proceedings of the 20th Conference on Pattern Languages of Programs.* The Hillside Group, 2013.

6. Mulholland, Neil. *Re-imagining the Art School: Paragogy and Artistic Learning*, Palgrave, 2019.

7. Rewarding negative results keeps science on track. (2017). *Nature*, 551(7681), 414. `https://doi.org/10.1038/d41586-017-07325-2`

8. Shaw, Aaron, and Benjamin M. Hill. "Laboratories of oligarchy? How the iron law extends to peer production." *Journal of Communication* 64.2 (2014): 215-238.

9. Stefan, Melanie. "A CV of failures." *Nature* 468.7322 (2010): 467.

10. Unger, Roberto Mangabiera. A Way To Save The Amazon, <u>New York Times,</u> Aug. 27, 2019a, A.23. Online: `https://www.nytimes.com/2019/08/26/opinion/amazon-rainforest-fire.html`

11. ~ ~ . The Knowledge Economy, *Verso*, 2019b

12. Wikipedia contributors. After-action review. In *Wikipedia, The Free Encyclopedia.* (2019a). Online: `https://en.wikipedia.org/w/index.php?title=After-action_review&oldid=917898036`

13. Wikipedia contributors. Causal layered analysis. In *Wikipedia, The Free Encyclopedia.* (2019b). Online: `https://en.wikipedia.org/w/index.php?title=Causal_layered_analysis&oldid=915878788`

7   Discussion: The Information Epoch of Economic History

Why did the cybernetics movement break up following the Macy Conferences? Perhaps it never came together. People stayed in their home disciplines. Many very thought-provoking meetings were held under the label of cybernetics, but the educational programs that were established did not survive in discipline-oriented universities. When their founders retired, the programs were closed. One consequence of the lack of educational programs at universities is that key ideas tend to be reinvented. One example is the work on complex systems centered at the Santa Fe Institute.

These writers rarely refer to the work in cybernetics and systems theory.

What prevented unity? There was never agreement on fundamentals.

Abstract. Drawing on demographic data, we advance the thesis that we may now be in a new historical epoch. The current state of affairs allows for new business models and new ways of organising production. It is also associated with strong demands for education and development investment, as well as innovation in these areas. We argue that alongside technical solutions we must consider new kinds of infrastructure and commons arrangements, changing mobilities, and the affordances of "Cyber space".

7.1   Introduction

Times are changing and people have lots of different suggestions about what to do about it. Ben Casselman suggests via FiveThirtyEight that we may need to go back to a service economy [3]. Elisabeth Mason writes in the New York Times [9] about social applications of AI and big data to education and job search. Richard Partington writing for The Guardian notes that technology stands to boost efficiency, while raising questions about employment and worker's pay [15]. We have been working together on artificial intelligence research, one application of which will be robust tutoring applications in mathematics [6]. As such we could only agree with Mason that AI tutoring has significant educational potential, while we note that much remains to be done on the way to building serious user applications. It may be several decades yet before mathematicians have to worry about job loss due to automation.

In this paper we combine demographic data with AI-inspired thinking to help understand the current situation and plot out some likely trajectories for the future. For example, we were excited to consider the prospects Mason pointed out, namely that somewhat similar technologies could be applied— and probably much more rapidly than mathematics tutoring—to help people find jobs. Why should a job seeker apply for multiple jobs each week if all they need is one, and a computer program can help make the match? In our view she is spot on here. Naturally the themes of education and job search are related, since in order to qualify for new jobs people may need further retraining. But this does raise a rather difficult question: what makes learning efficent?

Once, the answer might have been straightforward: apprenticeships. Nowadays, someone entering the the job market finds something very unlike the past of 100 or even 50 years ago. In another 50 it may be unrecognisably different again. Jobs themselves are changing, and the ones that are gone are not likely to come back again (how many lamplighters do you know?). Nowadays, a computer and a reasonable understanding of how to use it are a basic requirements for many jobs. Working often involves learning new skills (as we know from our own work). Education, too, is affected by technological change, indeed, this sector of the economy is "rapidly evolving" [1]. Social inequality in the West still has striking features, and global inequality even moreso. At the dawn of the millennium, World Bank researcher Branko Milanovic wrote: "An American having the average income of the bottom U.S. decile is better-off than 2/3 of world population" [10]. To cope, entirely new online and social infrastructures must be developed, along with knowledge of how to use them. AI and big data will help but will not directly solve these problems. People will have to be ready for change, which these days does not simply mean moving across the country for a job. We think that understanding the interactions between people, and between people and systems, will in the long run be more important than deploying new high-tech management techniques. We expand upon these points in the following sections.

7.2   Looking backward: 2015–1910

In order to get a long-term overview of employment trends, we will begin with the tables of non-agricultural employment by industry at the beginning of the twentieth century versus the beginning of the twenty-first century which appears as Table 3 in the centennial issue of the Monthly Labor Review [8]. Looking at this table, we note that, in 2015, the two largest sources of employment were "Wholesale and Retail Trade" and "Other Professional Services"; together, they accounted for 51.9% of the sample. Comparing the 1910 data against the 2015 data, we see that the largest private sector growth has been in the following areas:

1. "Other Professional Services" grew 863% from 3% to 28.9%.

2. "Finance and Real Estate" grew 185% from 2.0% to 5.7%.

3. "Educational Services" grew 177% from 3.5% to 9.8%.

4. "Wholesale and Retail Trade" grew 73% from 13.3% to 23.0%.

While "Wholesale and Retail Trade" is large and has grown, it may not remain large much longer due to automation and e-commerce. According to a recent report "Technology at Work" [5], 63% of sales jobs could be lost to automation. This impending change would undo the growth in retail and leave it significantly smaller than what it was in 1910.

While a large part of the decline in manufacturing is due to outsourcing, this alone does not completely explain the trend. As pointed out in a 2016 article in the Washington Post [2], even when industries which were outsourced return home, due to automation, they hire far fewer people than they did previously. This has led to a situation in which production is rising much faster than employment. Looking at table B1 of the BLS report, we see that the heading "Other Professional Services" includes subeadings such as "Computer systems design and related service" which did nor exist in 1910. Furthermore, by 2015, office automation was rather complete — filing cabinets, typewriters, and the like had all been replaced by computers and the corresponding job descriptions such as "typist" had gone away.

In addition to accountants, lawyers, analysts, brokers, etc.,the financial and professional services sectors now hire a significant number of programmers and data scientists and almost everyone working in that field is expected to be proficient at using computer programs relevant to their jobs.

The upshot is that, over the course of a century, jobs involving physical, in-person work have declined without decreasing productivity due to automation while jobs involving mental work, including those which make automation possible, have increased. Projecting this trend forward into the near future, we propose that we may soon arrive at a state of affairs in which, say, 25% of the working population suffices to staff the agricultural, manufacturing, sales, and transportation sectors of the economy with the other 75% working in information-related work such as education, research, programming, engineering, design, etc.

7.3   Are we in a new historical epoch?

We claim that the changes described above are the beginnings of a new economic-technological epoch, the previous three having been the hunter-gatherer epoch, the agricultural epoch, and the industrial epoch. Hence, in order to understand these events properly, we need to note that basic assumptions may have changed.

The names of these epochs refer to the predominant sector of the economy. Predominant does not mean that the other sectors are uniformly unimportant but rather that the predominant sector tends to be the largest and

is an important part of how value is generated in all sectors of the economy. For instance, during the industrial epoch people still needed to eat and hence depended upon agriculture for their survival. However, the introduction of equipment such as tractors and threshers turned agriculture into more of an industrial process and choices of what to grow and how such as favoring monoculture were in large part determined by technological considerations. As a result of the efficencies of industrialization, a family in the Midwest and a few hired helpers can nowadays cultivate 1500 acres, a plot of land as large as the holdings of a manor lord which were cultivated by an army of peasants, and the proportion of the labor force in agriculture has dropped from 90% in 1790 to 30.9% in 1910 to 0.7% in 2015.

Likewise, in turn, a society of the information epoch will still depend upon agriculture manufacturing and distribution but, the way in which these activities will be carried out will be heavily dependent upon the information sector and, as a consequence of the resulting efficiencies, realitvely fewer people will be needed to provide these vital services. Returning to agriculture, one can expect that agricultural machinery will get smarter and thus be able to do things which currently can only be done by hand — dreaming a bit, there might even be a swarm of drones which pollinate flower-by-flower, though today's state of the art farm robots would not have much chance of picking a tomato or strawberry without crushing it [4]. Future technology could make it feasible to replace monoculture with more ecological cropping patterns which take advantage of micro-climates and symbioses while still retaining the economic benefits of industrialized agriculture. However, doing this well will require programs to analyze the sensor data, model the environment, and coordinate the drones — the costs of research and deleopment and the work needed to write and mantain this software could easily dwarf the effort need to build and deploy.

7.4   New business models

@CHARLOTTE, how does this paragraph look to you.

Changes in the publishing industry may provide a preview of patterns which could spread to other industries. Prior to 2000, the only practical way to produce books was in batches of thousands and distribution took place through brick-andmortar bookshops, so the author of average means would require a publisher to pay the costs of printing up front and handle distribution and publicity. Nowadays, this is no longer the case. Firstly, print-ondemand services like Lightning Source make small runs of a hundred or so copies economically feasible. Secondly, a platform like Amazon allows

the author to set up a virtual store which sells printed copies on top of infrastructure for payment and distribution. Thirdly, the author can finance the enterprise through a crowdfunding platform like Kickstarter and publicize it through targeted ads and posts on social media like Facebook. In this way, a decentralized network performs the roles previously done by the centralized publisher and allows the author to set up a customized virtual publishing house. The hard part is writing the book, though with computational creativity in the mix perhaps even that is changing.

Historically, the industrial revolution started with mechanization of the textile industry. In order for factory production to be practical, clothes were made in standardized sizes and styles rather than custom tailored. However, now that there exist computer-controlled cutting and sewing machines (this need no longer be the case—with the new technology, it takes just as long to make each item in a cutom size as to produce multiple identical copies.

As a counterpart to the publishing example, consider the following story: Suppose that somebody wanted a pair of bright green jeans, like their favorite character from a Netflix show. He might start by typing his measurements into a CAD program to design the) jeans, then send the resulting file to a web service which would convert them into a pattern and a bill of materials and provide cost estimates. The price for bright green denim would be high because that would need to be custom dyed, but the minimum amount is, say, 39 yards, which is way more than is needed for a single pair of jeans. Thus our protagonist might advertise on a venue like Craiglist, Kickstarter, or Patreon and put together a package that cuts things out of the cloth (handbags, skirts, etc.). Once the deal has been negotiated, a bolt of white denim from the warehose will go to a custom dye shop and leave as a bright green bolt to the no-sweat shop where it will be cut up and sewn into the pants, skirts, and a jacket. These finished items then get sent off, pieces for the handbags get forwarded to another specialized shop, and a constraint program arranges the remaining offcuts of the bright green denim into a crazy quilt. A more complicated version of this story would have several kinds of cloths, management of offcuts, communication between designers and producers and so on.

Indeed, by analogy with splicing offcuts into a quilt, computer programs may actually be able to help create new jobs by splicing together different available sources of skills, labor, and information. Any of the examples above in farming, sewing, or publishing could turn out to be relevant to job seekers and could lead to job creation.

7.5 Organization of Production

As the ways of doing business in the examples spread to other areas, they could alter the structure of the economy.

The typical organizational structure of prduction from the industrial era was something as follows: At the bottom of the structure, we have the producers of various raw materials such as agriculture, forestry, and mining. Next, there is an infrastructure layer which provides common needs for the whole of the economy. One part is utilities which provide basic resources such as water, gas, electricity, and telephone service distributed through a nertwork of pipes and cables. Another part is a transportation network of railroads and highways. On top of this infrastructure rested two more layers: manufaturing, which turned raw materials into finished goods; and wholesale and retail trade, which delivered these goods to their end users. This organizational structure is changing as we enter the information epoch. At the bottom, the raw producers and infrastructure serve the same roles although the way in which they operate has been affected by automation. The day-to-day running of utilities has become increasingly computational in nature, and has expanded to include the communications cables, routers, and cell phone towers which comprise the basis for the Internet. At the top levels, as we have seen in the examples of publishing and clothing—as well as in the "farm to table" movement—alternatives are emerging to the manufacturer-wholesaler-retail paradigm which divide industry into different sectors and partition ecomomic activity between companies along different lines. As a new middle layer, we have companies like Amazon, Etsy, and We-Work whose business is largely based on taking resources such as warehouses, delivery networks, computing centres, real estate and repackaging them into a form suitable for use by other businesses and indviduals. Alongside these, there are business such as Lulu and Lightning Source for publishing, and numerous globalized software and data servces, fabrication shops, along with the hypothetical no-sweat sewing shop which perform specific tasks on input which they recieve from the transport and information channels and distribute their output through the same channels. Finally, on top there and enterpreneurs and businesses which combine and structure the services provided in the middle layer to produce virtual assembly lines and custom businesses.

- In the old system, whether it was of a communist or capitalist persuasion, there was a lot of centralization, things had to be standardized to be optimized. Now we have constraint solvers that can optimize

without standardizing and can route and schedule distribution and networks to make decentralization practical.

- In the old system, standardization in the form of centralized wealth was important to the pan-industrialist J. P. Morgan, and to Samuel Insull's Commonwealth Edison in Chicago that replaced smallscale generation with integrated distribution, as well as others who made mega-assembly lines; now the challenges have to do with distribution more so than generation.

- The old systems managed mechanical "failure" at the cost of days lost waiting for interchangeable replacement parts, possibly covered under warranty. Mechanical systems where themselves managed by bureaucracies. In Open Source Software, failure is managed in technical ways (bug reports, formal proof, version control, unit testing) that are an integrated part of the workflow. Support services for the new sort of business are more subtle and flexible. This is where technologies such as cryptocurrencies and block chains could play an important role by making possible micropayments and means for negotiating and implementing complex agreements between multiple parties in different locations (like in the green jean example). Similarly, the needs of this new sector likely will lead to new forms of finance and insurance.

An important part of the emerging new economy is an information commons consisting of software, data sets, and texts. Programmers and other information workers draw on this as a resource which enhances their poroductivity and, in turn, create new content which enriches the commons. Interactions on the commons such as posts to Stack Exchange could be used as input to a suitable computational process that would be used to assemble new job teams. The old question about "who owns the means of production?" is less broadly relevant now that most people can do work with a personal computer that has access to the information commons. Yes, there's a question of who owns the factory that makes the PCs, but that only affects a small percent of the population.

As noted by Monbiot, "there are four major economic sectors: the market, the state, the household and the commons" [11]. Whereas current socioeconomic thinking focusses on the first two, we suggest that, as the information commons becomes more important as the dichotomies of production versus consumption and workplace versus home decrease, the other two sectors will need to be taken into acount.

30

7.6   Education and Development

In the hunter-gatherer and agricultural epochs, the main source of energy was muscle power. Hence there were plenty of tasks such as clearing fields, digging holes, and hauling stones which required no education or training, only an able body. During the indistrial epoch, these tasks were mechanized but the machines were stupid. Hence there appeared plenty of jobs operating machinery and working on the assembly line which required a minimum of vocational training. Thus, for much of history, a person with a minimal education owning no special equiment and getting by on a bare minimum of food, clothing, and shelter could nonetheless be economically productive and play an important role as part of the hard-working bedrock upon which the edifice of production rested. This circumstance explains why practices such as chattel slavery and child labor, however ethically repugnant, were economically sustainable for such a long time.

Looking at the 1910 data, we see that domestic and personal service accounted for 14.5% of employment but that, by 2015, they shrunk to 1% due to the wisespread availability of home appliances.

Furthermore, the text states:

> "A century ago, most jobs required little formal schooling, and most of the population had not gone beyond elementary or grammar school. In fact, high school graduates were a rarity: in 1915, only an estimated 18 percent of the population ages 25 and older had completed high school, and only about 14 percent of people ages 14-17 were in high school." [8]

A century later, this is changing drastically—in 2010, 28.1% of the population had graduated college and, of these, 10.4% had gone on to graduate school. Due to the drying up of the service sector and the automation of the agricultural, manufacturing, transportation and retail sectors discussed above, we are approaching a situation where a person with a high school education or less is likely to be unemployable and hence a drain on the economy rather than an asset.

7.7   Inequality, Mobility, Spaces

While the degree of equality or inequality in a particular society will depend upon social, political, and historical circumstances, technology and economics set boundaries within which a society can be economically competitive. At the lower end, there is minimum amount which must be spent

on an individual in order for that individual to still be only able to contribute productively. At the upper end, there is a danger that excessive wealth will lead to rent-seeking rather than reinvestment. As always, inefficiencies may spawn successful competition using other modalities: e.g., some say that GNU/Linux was able get a foothold because Microsoft was abusing their monopoly and not improving their product (Windows XP) for a long time.4 The boundaries of the "low" and "upper" class varied historically, as have the permiability of these boundaries and the rates, and kinds, mobility within and between classes. Such issues are linked to other kinds of mobilities. Literally moving from place to place is one way to address inequality, insofar as a mobile person can try to improve their lot by claiming an opportunity that lies elsewhere.5 These days, growing internet connectivity and capability allow people to work from anywhere and telecommute to new opportunities. Geographic mobility may be less important given connectivity across geography. Learning can be seen as a virtual mobility that allows access to, and use of, new kinds of information. As such, learning is fundamental for the current era. In the industrial epoch, there was a sharp divide between the factory and office as loci of productivity and the home as the locus of consumption. For better or worse, schools often took on attributes of the factory. **Today the distinctions of home, workplace, and university are blurring and the household is re-emerging as a locus of productivity.** (Example: An exercise bike, which is interesting in its own right because unlike a normal bicycle you don't use to go anywhere. Now this bicycle also pairs with a television. Now I don't have to go to a gym to use it, and the instructor comes to me. So we have changed what used to be a public space, a gym, and this is now virtualized. This changes the boundary of public vs private space.) (Example: The suburb. This is made possible with a car. But, now we have an internet. So this is an even more enabling technology for the suburb. I can get food delivered. The house looks like a miniature ranch, but I don't have cows on it. Furthermore, I don't need to go to the city to have unexpected interactions. In the city, people live at high density, but they may be interacting with people who are on phones. The people they are interacting with could be anywhere. In New York people are all on their phones.) These are noteworthy developments in the social dimension. People have not changed on an evolutionary time scale, they still need food and exercise and social contact. We don't gather around a fire pit, but we might gather around a television (perhaps displaying a yule log burning in the winter). The suburbs initially grew around urban centers. E.g. the urban center of New Haven decayed, even though Yale is there. Only the ghosts of old Yale professors wanted to live there. Detroit is an

even more famous example. London is also a ghost town but in a different way. Ubiquitous smart phones and social media reshuffle our notions of space and make new forms of networking possible. Whereas, in the past, the costs of obtaining and maintaining a building would have been a sizable portion of most business's operating costs—and, similarly, the cost of obtaining an education would be a significant lifetime expense—nowadays a laptop just might do for both. Coffee shops and libraries are potentially useful complements to such an acquisition. Although libraries have been closing their doors or restricting their hours for some time, coffee shops are increasingly prevalent. Their near ubiquity shows the important role played by "third places" [13], intermediate between public and private, in the information epoch. In addition, new sorts of spaces such as flex space and coworking space are seen with increasing frequency. The classic idea of "third places" shades into a similarly-named but more theoretically charged concept, "third spaces" [16, 17]. The complex as a whole might be re-theorized as "Cyber spaces". They function as connectors, though they are not merely conduits. Whereas a highway largely exists to facilitate the exchange of one location for another, the cafe, and its later-day descendant, the Internet, permit a wide range of exchanges among people who may well be staying put. Mixed-modal settings, like those arranged using Meetup.com, can help groups of people assemble around common interests on a wide variety of themes, including many that are learning-relevant. Flash mobs, online dating, and barter sites highlight the further social relevance of new notions of "community," as well as people's willingness to involve technology in their social infrastructure. In the past, the quantity of unexpected interactions could only scale in cities with lots of people in them [14]. To have hope of modelling the stochastic interactions in new Cyber spaces that connect across major economic sectors and ecological niches will require a thorough analysis of network-, and broader interaction-effects [12], involving multiple "currencies" [7].

7.8   Looking Forward

A time traveller explaining factories to the folks who lived during the Rennaissance might in principle make headway by talking with them about clock shops. It would still be a difficult stretch of the imagination to go from that to a factory, even if the old town square automata featured simulacra of people sewing things. It may be similarly difficult for us to imagine the future of education. But we can nevertheless notice a trajectory. In the 1990s, library card catalogues had by and large been transferred onto computer catalogues. In the 2010s, most if not all of the library's contents are available in a com-

puterized form. Scholarship is quickly outgrowing the university. The total number of academic papers has exploded. Open Source software and online collaboration are additional ways to generate and share knowledge. Perhaps in light of the need for jobs, people will spend more time contributing to open projects like Wikipedia. This would be a good way for someone to prove they have the right skills for a given job: and with sufficient analytics, this may also lead to further employment— we can easily imagine a program that monitors wiki and Open Source contributions and invites applications based on what it finds. On the way to the more-automated future, AI successes will continue to amaze us with increasing frequency. While the latest conquest, Go, is something that people do for entertainment, applications of AI to education and job search—and indeed to job creation—will be directly economically useful.

7.9 REFERENCES

1. Sam S. Adkins. The 2016–2021 Worldwide Self-paced eLearning Market. Ambient Insight, 2016.

2. Abha Bhattarai. Factory jobs trickle back to the U.S., giving hope to a once-booming mill town. Washington Post, 16 March 2016.

3. Ben Casselman. Manufacturing Jobs Are Never Coming Back. FiveThirtyEight, 18 March 2016.

4. Joshua Chaffin. Farm robots ready to fill Britain's post-EU labour shortage. Financial Times, 25 April 2017.

5. Citigroup. Technology at Work v3.0: Automating e-Commerce from Click to Pick to Door, 2017.

6. Joichi Ito. Resisting Reduction: Designing our Complex Future with Machines. pubpub.ito.com, 14 November 2017.

7. Carol Boyd Leon, 'The life of American workers in 1915', Monthly Labor Review, (2016).

8. Elisabeth A. Mason. A.I. and Big Data Could Power a New War on Poverty. New York Times, 01 January 2018.

9. Branko Milanovic, True World Income Distribution, 1988 and 1993: First Calculations, Based on Household Surveys Alone, number Policy Working Paper 2244, World Bank, 1999.

10. George Monbiot. Common wealth. The Guardian 27 September 2017.

11. Andres Moya, The Calculus of Life: Towards a Theory of Life, Springer, 2015.

12. Ray Oldenburg, The Great Good Place: Cafes, Coffee Shops, Bookstores, Bars, Hair Salons and Other Hangouts at the Heart of a Community, Da Capo Press, 3rd edn., [1989] 1999.

13. Wei Pan, Gourab Ghoshal, Coco Krumme, Manuel Cebrian, and Alex Pentland, 'Urban characteristics attributable to density-driven tie formation', Nature Communications, 4, (2013).

14. Richard Partington. UK productivity jumps at fastest rate for six years. The Guardian, 5 January 2018.

15. Johnathan Rutherford, 'The Third Space: Interview with Homi Bhabha', 207–221, Lawrence and Wishart, (1990).

16. Edward W Soja, 'Thirdspace: Journeys to Los Angeles and other realand-imagined places', Capital & Class, 22(1), 137–139, (1998).

7.10 Reviews of The Information Epoch (Serendipity Symposium)

7.11 Review 1

The aim of this paper is to outline how the world economy is undergoing a transition being industry-focused to being focused on information and the technologies that support information. This is grounded in some statistics about changing job patterns, and a discussion of various specific technologies and companies as examples of how tasks are starting to be done differently.

The paper is rather broad - whilst there is a central argument, that of the economy becoming increasingly "infotized" - the arguments around this are rather scattergun. This is not uninteresting, and might have the potential to "spark discussion", but it feels like a "quick trip" through some interesting areas rather than a really strong story. I also worry about the lack of engagement with the academic literature about relevant aspects of economics etc.; most of the economic discussion is references with newspaper articles etc.

Most importantly, I'm not convinced that this paper makes a good link with the topic of the symposium. I can understand that there is some link between the "cybernetic" view of the future and the "information epoch'. Also,

I can see that there is a connection between voracious constraint solvers going out there and making unexpected connections between people's different economic wants and ideas of serendipity - the excess bright green fabric being re-purposed by other people. But, I had to work quite hard to make these connections - the authors could have made the connections more explicit to link this specifically to this symposium.

Overall - there are some interesting points in this paper, but it doesn't hang together particularly strongly, and, most importantly, it doesn't make its connection with the topic of the symposium very clear.

Specific points:

1. I wasn't sure what region the statistics in Section 2 covered. Are these worldwide, for one country, for one economic region? The reference seems to be to one country or continent. Same for Section 6 - what population is being talked about here? This matters a lot because the economy is developing in different ways in different parts of the world, albeit with some drivers etc. in common. More generally, I would have liked this paper to have examined more carefully how different parts of the world are affected by these changes, which groups in society might be disenfranchised or cut out by these changes (there is a little of this in Section 7).

2. I wonder if, in Section 5, it is worth talking about blockchain as a self-reinforcing, decentralised way of people making these decentralised agreements?

3. There is something to be included here about how IT/AI will influence the development of professional/intellectual work, as discussed, e.g., in Susskind and Susskind's book.[8]

7.12   Review 2

This paper puts forth the thesis that the current period constitutes a new historical epoch, looked at primarily from the perspective of macro-scale economic organization, but with some attention to other factors of social organization as well.

This is a somewhat strange paper to review. It takes a quite strong theoretical position, but as far as I can tell is not strongly grounded in any existing theoretical framework that could be used to account for what

---

[8]`https://www.amazon.co.uk/Future-Professions-Technology-Transform-Experts/dp/0198713398`

constitutes a historical epoch, and how we might know we are in one. Such a framework could come from the field of economics, from Marxist theory, from sociology, etc., but it seems necessary to me to have some such lens.

However for the present purposes, a larger problem is that it is not clear to me that the paper is on-topic for the AISB Symposium Cybernetic Serendipity Reimagined. It does not clearly relate either to the kinds of electronic artwork seen in the original Cybernetic Serendipity exhibition, or to the concept of serendipity in general.

8 Conclusions and Future Work: "What next?"

Keywords: Informal learning, peer learning, peeragogy, paragogy, causal layered analysis, paragogical action review, design patterns

Our PAR+CLA based analysis transformed rough material into clear challenges to address. By learning from past failures, and by using this combined methodology take what people gain in informal learning settings to better able to realize the potential of peer learning and peer production to help address the world's unmet needs for educational opportunity.

8.1 PLAN FOR AUDIENCE ENGAGEMENT AND INTER-ACTION

We will use multiple modalities in 4 micro-sessions.

- *10 minutes*: An introductory talk presenting the main findings from the paper.

- *10 minutes*: A social presencing workshop[9] to explore, in physical form, the Paragogical Action Review (PAR) and Causal Layered Analysis (CLA) methods that we use in the paper.

- *15 minutes*: A workshop-making-workshop, following the strategy of the Shift/Work artistic collective.[10] The room will break into small groups of 2-3 people, and create activities for the other groups, interpreting the themes of the paper through an explicitly transdisciplinary lens.

- *15 minutes*: The small groups will exchange and run their mini-workshop activities.

---

[9]https://www.presencing.org/aboutus/team/SPT
[10]http://www.shift-work.org.uk/

9 Appendix: Call for Futures submissions

FUTURES Journal

Call for Papers for a Special Issue from the 3rd International Conference on Anticipation

Guest Editors:

- **Andrew Morrison, Oslo School of Architecture and Design**

- **Dagny Stuedahl, Oslo Metropolitan University**

- **Ole Smørdal, University of Oslo**

Open for submission from January 2020

Closing date for submissions: April 30th 2020.

In October 2019 the 3rd International Conference on Anticipation was held at the Oslo School of Architecture and Design in Norway (AHO). The conference provided an interdisciplinary meeting ground in which researchers, scholars and practitioners seeking to understand anticipation and anticipatory practices came together to deepen their understanding and create productive new connections.

The aim of the emerging field of Anticipation Studies is to create new perspectives of how individuals, groups, institutions, systems and cultures use ideas of the future to act in the present.

The conference developed ideas from what the previous conferences had achieved. It encouraged a diversity of interests and actors to share in facing future challenges and shaping possible anticipatory alternatives, processes, emergent practices and actual sustainable pathways. Anticipation 2019 was located in a 'design university'; design is no longer a matter of problem solving but of working anticipatorily, that is in a reflexive interplay between making and analysing. Design as a transdisciplinary discipline was a major content contributor the conference and may be to this special issue.

The conference focus on Anticipation stretched participants to construct and communicate via a multitude of disciplines and domains, and more often than not through transdisciplinary linkages and configurations.

This call is for contributions that *emanated from the event, perhaps with further development.* The conference itself curated the papers in a number of thematic questions. These may be reflected in one or more editions of *FUTURES* journal, depending on the results of the submissions to the Special Issue.

The curated thematic questions were:

1. How to care for the future (anticipation and care)

2. Design by anticipation

3. Time in shaping anticipatory practices

4. The future as an anticipatory network

5. **Performative anticipation**

6. *How 'anticipatory learning' happens*

7. **Feeling the future (e.g. embodied, sensory anticipation)**

8. Shaping critical cultures of anticipation

9. Means and methods of making the future accessible.

Submission information
Papers may be submitted from January 2020
The deadline for submissions of new papers is **April 30th 2020**
The expected date of online publication of individual papers is 3 weeks from final acceptance of each paper
The expected publishing date of the Special Issue is approximately 6 months after the closing submission date.
Please read the guidance to authors before submitting:
`http://www.elsevier.com/journals/futures/0016-3287/guide-for-authors`
Articles submitted for publication in *FUTURES* must show awareness of the futures field and *make an original contribution* to the advancement of knowledge in Futures Studies (which includes Anticipation Studies).
In this special issue, the focus is on advancing theoretical and conceptual knowledge with respect to anticipation; it needs to be rigorously developed through reasoning and evidence.
This journal operates a **double blind review process**. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the academic quality of the paper.

10 Author list

- Robert Best

- Charles Blass

- Joseph Corneli

- Charles J. Danoff

- Lisa Snow McDonald

- Chris Meadows

- Charlotte Pierce

- Raymond Puzio

- Paola Ricaurte

- Melanie Dawn Weir

11 Acknowledgements