Opening Remarks

- Erik Fisher introduction
- Four workshops running in parallel to each other; now we bring representatives from each together
- Goal is to create this field; assess the state of it
- Goal is a report that takes stock of this field of sociotechnical integration
    - Bigger goals too – a journal that will allow us to publish and foster discussion
    - Also hope to lay an intellectual foundation for funding organizations to be able to fund more of this kind of collaborative work
- STI is not a number of things it overlaps with
    - Not multi-, trans-, interdisciplinarity; not CTA; not team science
    - It involves team science, but not identical to team science; it involves problem solving, but that's only about 80% of what I see sociotechnical integration to be, bringing them together isn't just for the sake of solving problems, but for framing and defining problems
    - Expertise solves problems and defines problems; sometimes we have competing problem definitions; also inquires into the nature of problem definition in society
    - Also involves capacity building for governing knowledge and expertise
    - Also involves things like reflective practice
    - Probably need collaboration 90% of time to get integration; but you can also have reflective practice that is informed by past experiences and not ongoing conversations
- Want to define this space in a way that includes a lot of methods and goals for bringing these communities together; focusing on knowledge practices allows for a slightly wider focus
- Today we want to take stock of the kind of STI that's in the room; then we want to have a discussion and find out what other communities there are in the room and the world that haven't made it to us
- Here because of a failed NSF proposal (Julie Thompson Klein and Harry Collins couldn't be here today); trashed for not including geographers, and for not attending to the power dimensions
- But, the threefold (forms/means/ends) is a distinction that will allow us to understand things more thoroughly
- Forms – concepts, theories, and assumptions that any and all of these communities of integration that can be individually identified, but can also be grouped together (overlapping and diverging)
- Not looking to build an overarching theory today; just a tent that people can collect under with a plurality of approaches
- Means – methods and tools. How are they distinct, overlap, grouped together, diverge?
- Ends – goals and rationales that are mobilized by each community. What are they working towards, how do they rationalize, how do they justify their

activities? Could be large (e.g., make society work better) or tangible (e.g., reduce stress in team collaborations). Not looking for a mission statement because we are about many different things, but looking for the plurality of goals that are being pursued by these various communities

- How effective has STI been at using its own methods? Evaluating according to our own goals and goals of other projects in the movement.
- Both more narrow than interdisiplinarity (focuses on a subset) but wider than disciplinarity (looking at problems on a broad structural level)
    - This is why looking at expertise takes us beyond problem solving, and towards problem framing and assessment
- Everyone should go to the website – does three things… suggest additions to community, suggest additions to bibliography, discussions/critiques/comments
- Then, breakout groups – each group will be charged with finding the state of socio technical integration, and come back to have time to share, do this work, write this up.
    - Groups need both note taker and facilitator
    - In a way, writing mini-report – each group goes through similar exercise. Thus, we won't simply report back, but have some cross talk. Then, core group asks questions of everybody and begins to assign tasks – things to do tonight/tomorrow to help facilitate work by core group tomorrow, and subsequent report writing in coming days.
- Thanks to core group, attendees, NSF/CNS/EUC/GIOS/Cardiff, Regina/Michelle
- Michael Crow welcome
    - Expanding and making more robust the algorithm for thinking about where we want our science to go
    - Cultures between social, scientific, technological, economic systems – variable intent and purpose
    - How to allow for fundamental discovery while also steering those discoveries to allow for the outcomes we want (e.g., failure of the healthcare system)
    - How do you bring a normative consciousness to our reflection and deliberations about science
        - At ASU, it's the coexistence of fundamental sciences with the breaking down of disciplinary hierarchy to replace it with transdisciplinary research projects
    - How you organize the production of knowledge affects how we can use and implement that knowledge
- Tom Seager
    - Often when we do STI, the social sciences come in with a sense of this disciplinary hierarchy, and the engineers don't know about it because they're on top
    - Engineers are happy to collaborate within subfields; it's the sociotechnical integration that is particularly challenging

- Engineers aren't at all uncomfortable with normative dimensions (e.g., what we ought to build), but social scientists are often uncomfortable with what gets labeled as 'activist science'
- What are we trying to integrate?
  - EF: At a broad social level, values and perspectives (if you try to integrate knowledge, what are you integrating?)
  - Not sure what we're integrating when we integrate science/society or social/technical – this gets at the expertise that defines and solves problems, and the host of social factors that assess the way these problems are solved
  - TS: Part of our agenda is to try and figure out what we're integrating – this broader and more complex type of knowledge is what we want
  - EF: We don't want to lose sight of the capacity building and problem framing that might come from this 10% area
- Learned from SEESHOP that we need to get beyond the explicit knowledge – what we are primarily concerned with is the cognitive, ranging from explicit to tacit
- From STIR, you can't just have intensive conversations, you have to go and immerse and do their experiments – not merely an interactional expertise
- Toolbox taking things out of the tacit and making them explicit
- So, lots of activity in the cognitive – the tacit is resonate in people, it's not resonate in our books/webpages/writing, it's in us and our minds – so, if we're going to do STI in a way that includes full collaboration, we need to overcome more than just the cognitive, but also the conative and affective barriers
- Different disciplines with privilege different conative strengths – we weed out people who are not working in a way that aligns with what we've decided is the proper conative approach to problem solving
- Engineers cannot continue to work in their normative way without being informed about the limitations of their problem framings and formulation stages

Panel

- Rob Evans (Interactional Expertise)
  - IE grows out of the idea of CE; the ability to contribute to a community of practice (the community of anvil bashers who bash anvils and also talk about anvil bashing) – IE tries to get at this speaking element
  - Creates the possibility of someone hanging out with the anvil bashers and learning to speak this language – the distinction against embodied practice
  - In the early days of talking about IE, it was an outsider who learned the discourse of the practice (we've moved away from that a little)

    - Being able to speak the real language isn't the same as reading the books aloud – the books will never quite get you all the way to IE without the immersion
    - The way it's moved on is characterized by Collins in Language and Practice (2011)
        - Within the community of practice there are different subdisciplines that work together for larger goals (e.g., gravity wave detection)
        - By and large you don't actually do the practice of the other people – most of what people know about what goes on in that field is known through language, not practice – emphasizing the ubiquitous nature of IE, and the physical practice contributes a relatively small part – changing so that the language is more important than the practice as a whole
    - So, do we have a shared language that allows us to communicate across many of these subdisciplines? Likely not right now, but perhaps at the end of the day
    - Fractal model suggests that the same kinds of analysis works at many different levels
    - We test for this through the imitation game – if you have IE you can produce the discourse in an equally plausible way
        - Relatively high up on the fractal model (religion, sexuality)
        - Results from the EU religion study
- Michael O'Rourke (Toolbox Project)
    - Three ends that Toolbox is striving to achieve
        - To comprehend the range of integrative processes that are at work in collaborative, cross-disciplinary activity – this covers not only just cognitive processes, but certainly affective processes, and perhaps conative processes
        - Facilitate cognitive integration in the context of collaborative, cross-disciplinary activities
        - Evaluate the hypothesis that structured philosophical dialogue among research collaborates can enhance collaborative dialogue by means of enhanced understanding
    - Focus on integration as a process that takes place in the context of inquiry – typically involving multiple epistemic perspectives; integrative process is affected by an integrator who brings these perspectives into integration
        - A is not the same as B; S integrates A and B under a relation R, where the relationship is determined by practical and pragmatic purposes
    - Integrators are often people, but can also be structured processes of various types (such as the Toolbox project)
    - Toolbox project is about improving the understanding of communication about research content within cross-disciplinary collaboration

        - Concentrating on the value of philosophy in affecting this integration – has a couple of millennia worth of contributions about what empirical work is/how science operates/etc and take full advantage of what philosophers have learned; and because philosophical methods are abstract it allows collaborators to set aside concrete differences and find common ground
    - The Toolbox is a structured survey instrument with 34 questions that aim to articulate fundamental research assumptions that scientific collaborators may make about the world, process, and themselves
        - About facilitating a dialogue about the issues that relate to the prompts and module heading
        - Distribute instruments to participants; fill them out themselves; and very light facilitation – allow collaborators to work through the questions themselves, to do this cognitive enhancement on their own
        - Pre and post-test data
    - Run 98 workshops in three countries; 84 workshops with variants of this instrument
- Mike Gorman (Trading Zones)
    - Bottom up integration project that emerges
    - Idea is to begin working together towards something without necessarily having considered it philosophically in advance
    - Language emerges and begins to be shared, progressing towards a creole that can be taught forward (e.g., graduate students)
    - Instead of confronting the assumptions directly, you begin exchanging and working together first, the language emerges, and you being to work towards these goals over a long period of time and slowly begin to understand each field via this trading
    - Graph with a large set of ways in which these trading zones can emerge; create a boundary object and language that emerges
    - MG: don't think that there's incommensurability among the communities in play here; interactional experts can play the role of a trade agent who is conversant with 2 or 3 fields, and can act as a catalyst or facilitator to bring these trading communities together
    - Trading zones is more like a method than an approach
    - What are we trading for? E.g., building the mars rover, creating a large telescope. So, what brings us together as communities and makes us want to work together? A new field is only one possible result – could trade for a while and then return to your discipline; could continue as an effective trading zones
        - Reports, a journal article, potentially journal (because communities are too small in and of themselves, but if we bring them together and find enough commonality, that might be a useful outcome), research center/consortium

- Tom Seager (Conation)
    - NSF is funding a panel at the national research council studying the science of team science and focusing on the team cognition element
    - Erik is correct to say STI is distinct from team science; but the panel is more ambitious than this mechanical collaboration (e.g., building a mars rover)
    - Perhaps a community of practice is a better way of putting it than a new field
    - Conation isn't like these others – never created with the idea that knowledge integration is the end, whereas the others do
    - Most important for conation is the form – theory says that there are innate, immutable strengths (behaviors that people engage in that are not malleable through cognitive training)
        - If you ask people to step outside of these behaviors, people will injure themselves emotionally or physically
    - Because some disciplines prioritize certain conative strengths over others, our academic system weeds people out who are poor matches for the conative strengths that are encoded in the disciplines
        - E.g., rocket scientists can put something on mars because every element is geared towards fact finder follow throughs (everything is known), but the same group can't respond enough to build a missile shield that can react to unknowns
    - Assessment is insufficient; must build an understanding of what the assessment means. Then, must match people's strengths to tasks so that teams can be designed in complimentary fashions
    - Conation has never been formulated with the idea that the end is knowledge integration; typically applied in settings where the team has a shared goal/object
    - Goals are allowing people to be themselves; removing the stress of having to work conatively in a way that isn't well aligned with your strengths; that the work will come more easily to us working as a team with well aligned strengths
- Erik Fisher (STIR)
    - STIR is an approach motivated by a sense that science/society interface can become more and more turbulent to the point where policy and decision makers have to deal with complex questions about what is acceptable
        - Nanotechnology is a good example because there is high level mandates for the integration of science and society goals
    - Engage in a series of methods that are designed to expand the range of things considered and technical options (i.e., expanding both the values and the technical, the social and the technological)
    - The goal is to build a capacity that is able to govern science policy in a way that is sensitive to more than just the technological concerns

- Form is as a theory of midstream modulation – positioning selves in the middle of discourses that say (A) you need strong, top-down systems to govern emerging science and technology and (B) simply leaving science alone, giving it money, and hoping that the goods will follow
- There are constantly new innovations that require ongoing governance
- Midstream modulation takes that we already know what kinds of programs we're going to fund, but it's not downstream in dissemination/distributed use yet – very anticipatory
- Posit that there are de facto decisions and modulations already going on; and we feed this information back into the field (not just a lab ethnography of what's going on cognatively, culturally, epistemically, etc, and we feed it back into the field)
- Make observations, describe them back to the practitioner, try to do co-description in order to do co-inquiry so that we can have a broader impact
- Do this with the STIR decision protocol – what are you doing, why are you doing it, how could you do it differently, who might care about how you're doing it
    - Sit with practitioners a couple of times a week over a twelve week period; in between of interacting informally, hanging out, attending meetings, observing what's going on, etc
    - Focus on tracking how decisions are made in the laboratory; a way to routinize the procedure and engage people in the lab in a way that institutionalizes this awareness
- Really focus on the first step towards the grand goals of reflexive governance and anticipation
- Typically progresses from "we don't make decisions" to "I guess I do make decisions" to changes in how the lab works, talks, and shares their projects
- Productively perturb the system in a way that makes it more intelligent

Post Panel Discussion

- Katie and Knowledge Integration
    - New undergraduate program at the University of Waterloo (majors are quite specialized in Canada; so more like a liberal arts with an explicit focus on interdisciplinary collaboration)
    - Incorporated some of this into the program (social nature of knowledge; nature of scientific knowledge; interactional expertise; toolbox project); students really enjoy this relative to traditional philosophy
    - Tom Seager: By teaching this to undergraduates, we're able to learn a lot more about this

        - KP: All faculty were trained in conventional disciplinary fields; most challenging is training these students to be interdisciplinary from the get go – so students can find this frustrating because we aren't interdisciplinary enough because of these pedigrees (actually brought in facilitators to help exchange between faculty members)
- KP: Feminist epistemology as a resource for attending to power relations that NSF wanted in the proposal
- *Quick break to reflect*
- Bill (Columbia College – Game Philosopher – McCarthy Boot Camp)
    - Interest in how to get results from teams; affective and conative
    - McCarthy Boot Camp is a three day immersive game simulation boot camp; given a list of normative behaviors you're expected to follow (named for software design; check-in, investigate, check-out, personal alignment)
    - Creates a delineated space with a goal surrounding it (an "affinity space")
    - In emotional check-in you can be "glad, sad, mad, afraid" to disclose your emotional state at the beginning of any stage of teamwork
    - Attempting to empower rights so that you can create a safe/sacred space
    - As a game designer, always thinking about how space is designed
    - "once information gets lost in a system, you get politics, because people can use that loss of information in that system"
    - Moving from a cognitive space to an affective space by facing each other, creates a new kind of energy
- Erik: Reframing & breakout groups
    - Chanel energy into understanding the state of the field over lunch
    - What are we talking about (forms)? How are we doing it (means)? Why are we doing it (ends)?
    - Always looking for both overlap and productive tensions
    - Heterogeneous groups and mix

Breakout Groups Reporting Back

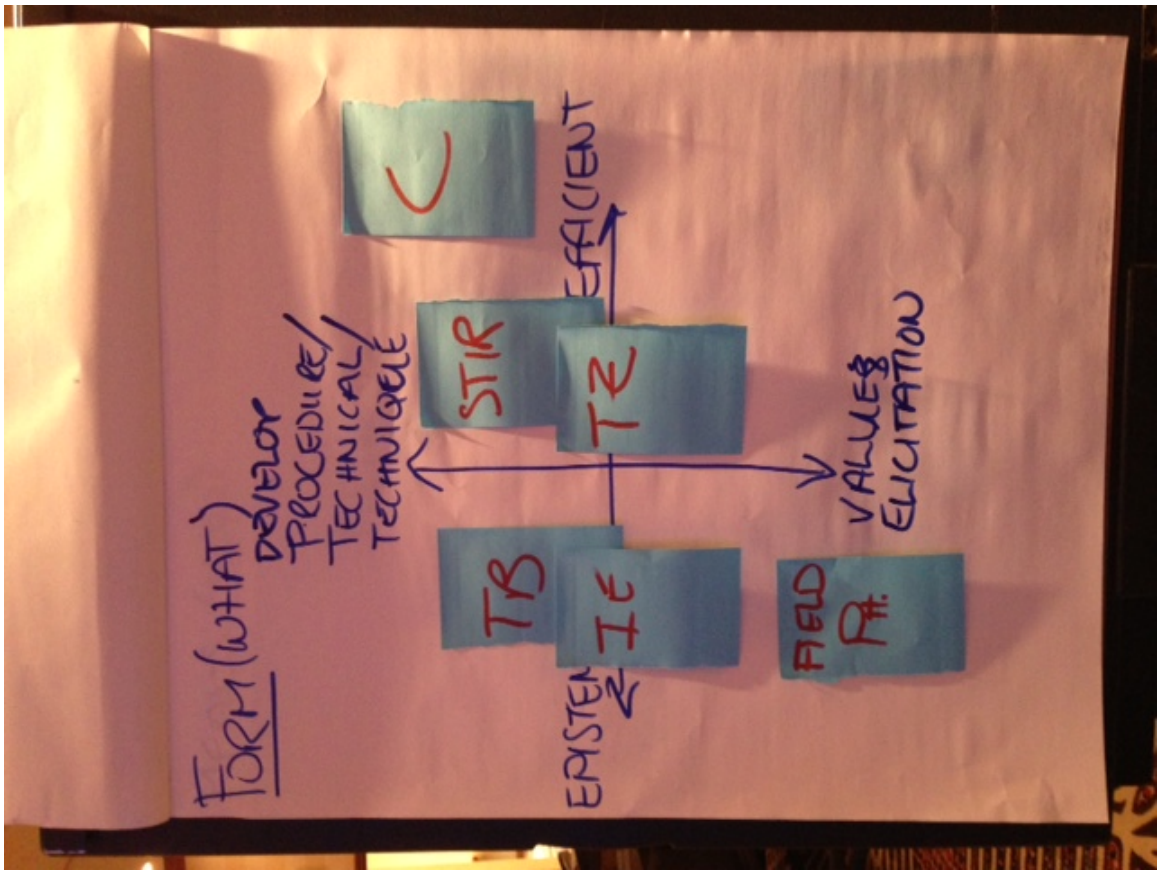
- Group 1: Shannon, Jathan, Stephen, Rune, others
- Explained where the toolbox project came from, and a similar discussion of STIR – similar notions about adding insight, but through different techniques
- Trading zones came up; conation not at all – primarily spent time on SEE
- Core issue was how to make sense of embedded humanists – how to make sense of what they need to do to get a voice, and what they're adding to the group when they do get a voice
- In terms of ends, dominated by 'shaping science' – a sense that science is doing something for someone (undefined) and science could do that job better – whatever we're doing, we're think about how to shape science so that it can do this job better.

- In terms of means, a key point is history – to make sense of what's going on, you need to understand the history of science studies (lab life; science wars; SEE)
    - SEE turned out to be the fundamental science; the intellectual form that got the most play in the group
- Integration turns up with question marks all over – whatever it may be
    - "Any concept insufficiently defined turns into magic"
    - Maybe there is this thing, integration, which might be an achievement and important way of shaping science – whatever magic people do, it might have an impact
- In terms of forms, turned up again and again:
    - Notion of a problem (needed it be created; solved; evaluated); different communities have different problems; you legitimate your problem by getting someone else to take it seriously (i.e., involvement of the humanist can include this legitimating force)
    - Integration is a concept that does a lot of work, but see above…
    - 'Perspectives'; different ways of talking about the world, part of the richness and challenge that's involved (EBK: Knowledge Systems, World Views)
    - Expertise (focus of most of the group's work)
        - Just how rich is this notion (Katie P, Eric K); having some interactional expertise gives someone from STIR some skin in the game. What role does IE play, what do you need to do to get skin in the game? "Once you've got skin in the game, you're making a contribution as well." The humanist embedded in the lab has to get some expertise (likely instrumental), but they're also bringing their own expertise to the table (EBK: Relates really well to Katie's talk and my comment of the positive/negative dimensions), but if it turns out that this perspective makes a contribution, they've had expertise in this area all along. How do you recognize in this framework of expertise what the embedded humanist brings in terms of value to the laboratory?
            - It's thought that the embedded humanist makes a contribution; but it flows from their expertise; so how do you describe this in the SEE framework? Bring their own expertise to the community they've joined.
            - Rob Evans: Take Epstein's AIDS activists – have medical folks who do the trials, and the activists who gain expertise, and what counts as a trial gets changed; the practice language is changed as a result of including a new domain of expertise in that field. The nature of the contributory expertise in doing the science is somewhat broadened out – you've added a new person to the

fractal model. So, the AIDS Activists were contributory experts in the clinical trials.

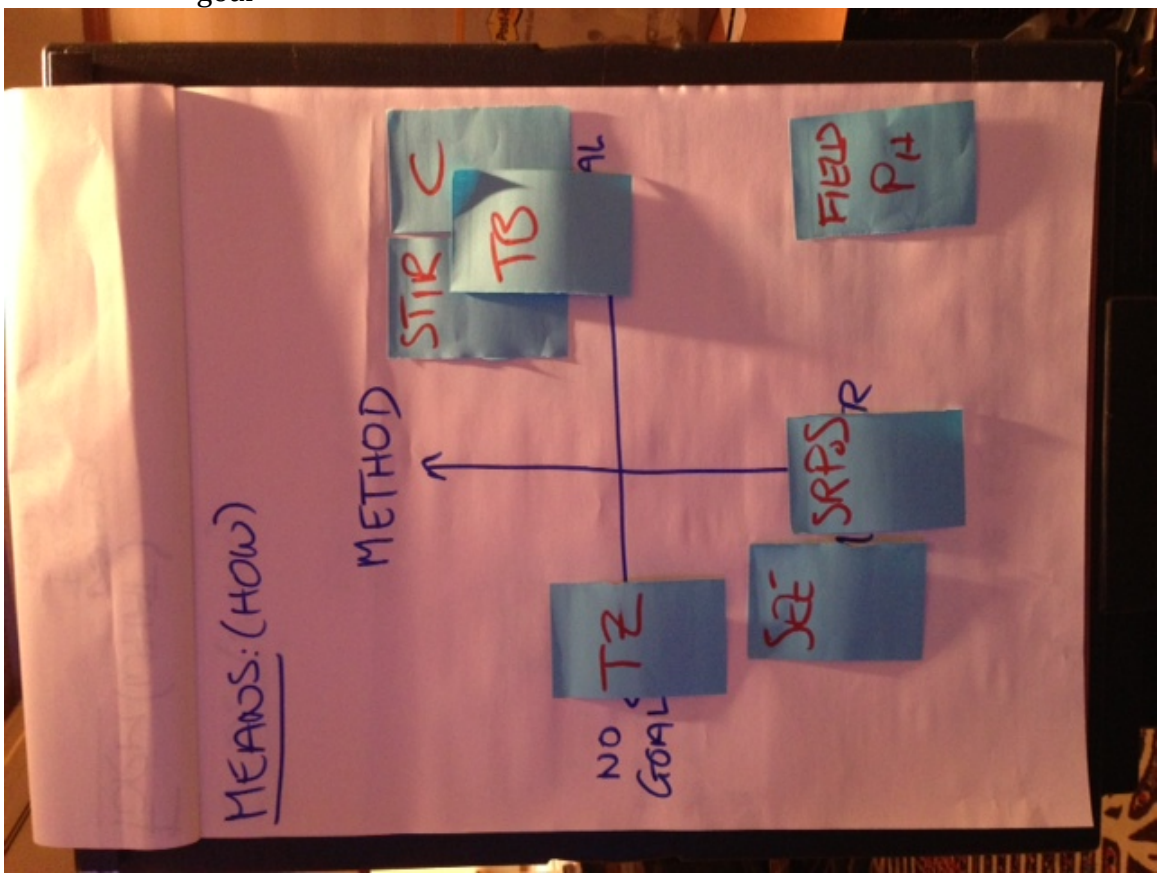
- Michael O'Rourke: Once the embedded humanist is included, the project changes in a sort of way where the humanist becomes critical to its success (Erik has this quote); became (in his example) a contributory expert in a new project that emerged – in his location, he was responsible for contributions
- Mike Gorman: His expertise didn't change, but the domain changed to include philosophy
- Rob: When you're working with the engineers, are you the equivalent of a man with an anvil, or are you a specialist IE?
- Katie: Contributing interactional experts who come from a different pedigree, but making contributions in ways that are more substantive than talking about the practice
- Erik: One way is to describe this is in relation to the expertise they bring; but if we can locate the dimension that changes in the domain, that has more interesting theoretical implications – an evaluative dimension, or the scope of attention changed; change based on the community or based on the project
- Michael: Because the domain changed, other folks also became contributing interactional experts in some of the philosophical questions – opportunity arises for them to become contributing experts in the other direction
- Katie: Not sure this actually happens, though – in BG, we do epistemic analysis of their work, and they change, but they couldn't walk into our room and pass as a philosopher – they could speak the language with respect to a very narrow domain
- Rob; Eric: This is part of the fractal model – end up with involvement in specific levels, but when you change the scope of the levels, people max out; at the level you collaborate, you can have exchange. Special name might only be needed when it's unique – when the role becomes ubiquitous, labeling becomes less relevant
- Britt: When Erik asked the question, you divorced it from an area of expertise and asked about the specific area; but also a way to describe this just in behavior changes, and don't need to go back to the area of expertise

        - Erik: Is this a potential area for the field to evolve? Where is the locus of the change?
    - Gabriel Baaumer's work – that you could be an expert in integration (Integration & Information Sciences) – involves significant metacognitive competence, as well as a sense of what's involved in expertise
    - Instrumental expertise is a means to an end to get skin in the game, and you want skin in the game to be able to be heard so that people can listen to you and you can make positive change (EBK 2013); but are there other ways to get uptake to your concerns – the notion that you could be an expert in integration could be another method or pathway that allows for uptake
    - Michael: Is a precondition of something being a field that it's possible to be an expert in it? Necessary condition?
        - Stephen: No. I think there are people who are experts in interaction (Gabriel is creating a discipline because she must have some idea these folks exist already). But, the answer to the necessary condition might be yes
        - Michael: Just trying to tease out what is a criteria for being a field; so we might need to have experts for it to be a field
        - Britt: It's political, not epistemic. In Gabriel's case, she wants to generate a discipline in order to have a seat at the table in the university. There are epistemic things that come along with it after you develop the field (degrees, grad students, journal), but impetus is political
        - Stephen: If there's something that counts as a field, you will be able to identify the experts
        - Erik: Distinguish discipline from field – there might be a field of inquiry characterized by questions, rather than by a set of formal and tacit knowledge practices
- Rob
- Form, developed a 2 by 2 with:
    - Develop procedure/technical/technique vs. elicit values
    - Epistemic vs. efficient



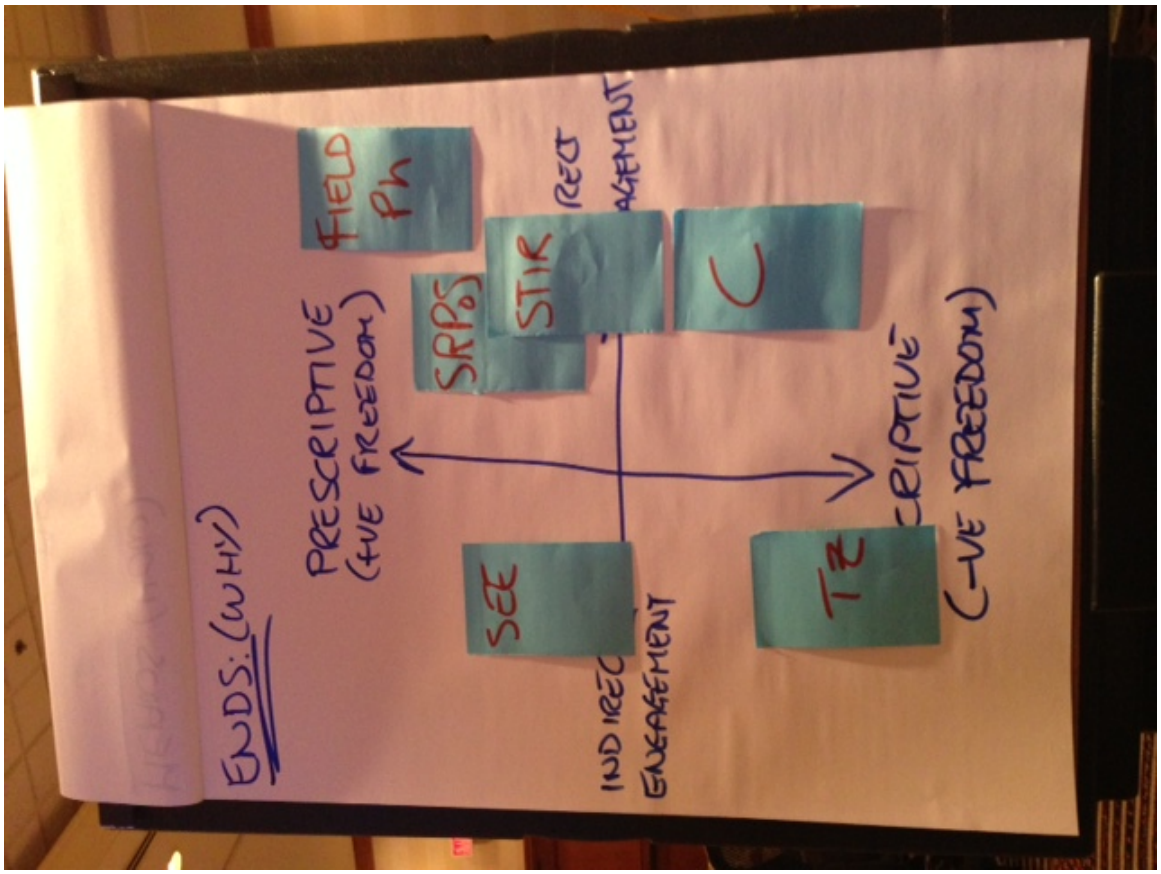
  - Conation, for instance, is very technical and efficient – a tool that's blackboxed so that it can fix things in a reliable and quick way; Field philosophy is the opposite – focused on epistemic and value elicitation
  - Erik: seems like it's a radical change to bring science and society together, not simply a question of efficient
  - Michael: the epistemic to efficient axis is something like understanding to action
  - Rob: Question is 'what are you using x for?'
  - Tom: depends on where it's being used (e.g., in classroom vs. for research about the process)
  - Erik: Goals and norms are nested; what Michael's focusing on is some deeper self-critical understanding
- Means, developed a 2 by 2 with:
  - Method vs. Manner
  - No goals vs. goals
  - STIR, Conation, Toolbox all have very well specified goals for what they're trying to do, and all of them have very specified methods about what they're trying to do
  - Whereas, field philosophy is simply going to the pub (goal, manner)
  - The more explicit/external the method becomes, the more blackboxed it becomes, and the more you can get other people to do the work for

you; while the less structured it is, the more the individual is themselves the work and must be involved in it
    - "Once you learn to talk about expertise in the right way, you can do whatever you want with it"
    - Specificity of the method, steps you've already taken towards a kind of goal



- Ends, developed 2 by 2 with:
    - Prescriptive (positive freedom) vs. descriptive (negative freedom)
    - Indirect engagement vs. direct engagement
    - This is perhaps the one we struggled the most with labeling
    - Trading zones is quite descriptive, but also a very indirect engagement
    - Whereas, STIR/SRPOS/Field Philosophy/Conation are quite direct in their engagement
    - Freedom for tends to be more content to positive freedom – might even put certain constraints on people that might be perceived as interfering with their freedom; for negative freedom it's more like libertarianism and freedom from – remove barriers, use it however
        - Erik: STIR walks the line, but the ultimate during the lab study is a voluntary model – if this process of collaborative inquiry produces the sense in the practitioner that she should go in a new direction, it's a self judgment

        - Britt: You're setting it up in hope that it will move in that direction
    - Federica: when I talk about freedom, it's substantial vs. procedural – STIR isn't an ethnography of the lab life, so it's not descriptive, you want to intervene; but it's more at the procedural level. When it's substantive, you have a normative agenda that you want to bring in. Space for another distinction.
- Where does toolbox fit?
    - Britt: Removing barriers?
    - Rob: lightly facilitated.
    - Katie: Facilitator isn't pushing a set of norms, and data analysis is deeply descriptive
    - Michael: Project is prescriptive if it is prescribing some sort of objective or contributing to the achievement of some sort of objective with which it interacts
    - Erik: Is the goal internal or external? Internal to who is engaging, or external?
    - Michael: Goal is to enable the group to function better
    - Katie: But the group sets those goals; a feminist toolbox project would be far more prescriptive in how it brings up issues of epistemic injustice
    - Britt: And those are a lot of the things that people would interpret as interference
    - Michael: This is helpful – we def. don't prescribe ends
    - Katie: it's a continuum
    - Michael: the descriptive makes more sense under form
    - Tom: You expect the project to change after interacting with your team, but you aren't prescriptive about how it changes



- Software speaker, Paul, Shannon, Robin
- Big 'ahha' we had with integration is that there isn't a notion of disintegration; when we're talking about the tools that Michael and Stephen made, their goal is to disturb the system to generate ___
- Tom: Saying you need to break things before you put them back together?
- Yes: Break, perturb, disrupt, disintegration
- Helps give information about the type of integration you want to do; we've only been talking about one type, the embedded observer. But, we think there are multiple types, and you can only get the information you need to decide on type by disturbing the system.
- Putting forward a bunch of different types of integration – seems to be IE, CE, trusted mediator, breaking & reforming experience, and something about the three handled anvil (maybe having people experiencing different roles through simulation?)
- So, solution strategy becomes perturb system, get information, choose type of integration
- Britt: Why integration?
    - Katie: indeed, communication – trusted mediator facilitating communication

- Michael: don't always want deep integration; creating new a system of parts that are interconnected – might differentiate between a mixture and a compound
- Britt: If could reverse the example of using STIR, it's a policy pull
    - Erik: yes and no, you can say the policy is a sign of a pull
    - Britt: We might want to consider the degree to which we want to go with a term that is out there already, but might actually be problematic for us in the future – integration. Once you get policies calling for integration, you might get calls to measure integration. If we're unclear on what it is, it will be really hard to measure; but if we're clear on it, it will put restrictions on what we do
    - Erik: Goal for STIR is to not get messed up policies; can have this linguistic problem with any word choice. Not sure that changing the name and calling it something will make you immune to the pathologies of modernity
    - Britt: Some are less susceptible; communication is better
    - Tom: How do you know when you've crossed that threshold?
    - Britt: We put up a diagram, for instance, saying what we do doesn't have a method; and it becomes problematic if integration requires a method
    - Erik: You're always going to face this problem, you just need to make it your strength… e.g., open ended inquiry of STIR is essential to its success; what we're doing isn't always communication or collaboration – it doesn't focus on the outcome, it's a means to an end, and we want to focus on where we want to go
    - Rob: Part of the potential problem is that the field itself becomes sociotechnical integration; if by that we mean some form of increased homogeneity among participants, does that always imply that the work of this field is always orientated to bring people more together than when we started. Are there ever cases we can imagine where we'd call for increased specialization and disintegration?
    - Britt: Yup, and there might be value in dis-census rather than consensus
    - Katie: Enhanced communication and understanding isn't always leading to integration – it's enabling more constructive and positive conversation. Have same debates about pluralism vs. monism – i.e., we need one overarching theory of human behavior, so we need people to come together into a single theory; whereas Longino would argue that you need plurality and different approaches to work together in a non coordinated and non integrated way
    - Michael: I don't think integration implies consensus, and integration isn't always what we want
    - Erik: We would probably all celebrate diversity, conflict, heterogeneity, pluralism, dis-census; I can see the logical fear with "what if we're successful". If you're calling it integration, you're still

thinking about diverse things that are being brought together. Now, in terms of politics, don't worry – we're not going to get consensus out of this – it will be defined in a way that is still diverse, perturbing, etc…
    - Rob: So, is it like a department of peace studies?
    - Katie: I don't have a concern in some ways, because we're going to write this up, and capture this sprit, and the like – but for people who don't already work in this area are much more likely to have a strong view of what integration means
    - Erik: Fair concern, would this look to the world like we want some sort of consensual, lock-step process, and that will be a problem. If no one looks past the title, it's a problem – either a risk we take, or something we deal with by giving it a new title
    - Tom: But we do want this integration between the social and the technical!
    - Michael: One of the contributions this group can make is by calling attention to the limitations of the concept. There are groups of people who might have much bigger aspirations for the concept of integration – Gabriel's group might be one of them – that integration is the holy grail, and the reservations being expressed here are legitimate and deepen our appreciation for the complexity of doing this work. What the communities involved give us is a detailed purchase on what these things look like on the ground
- Michael & Erik
    - Crossed out a hundred iterations of labels on two axis because we were trying to do a stronger program
    - X is form: Practice vs. theory
    - Y is ends:
        - Normal science vs. post-normal science (how science changes as changed by engagement)
    - IE is more on the theoretical understanding end in trying to figure out how expertise works
    - Midstream modulation on the border between normal and post normal, and more on the theory end (not quite as developed as the others), but does claim to describe social or technical change with or without a humanist
    - If we filled in specific instantiations of these cases, these points will move around (EBK: and that you can plot ideal types vs. specific examples vs. a bunch of examples)
    - Toolbox as being about communication and facilitating scientific activity – a little more normal and practice oriented, reinforces normal scientific activity in many ways
    - Trading zones is trying to bridge incommensurabilities, more likely to lead to transformative results
    - STIR is oriented towards the practice of science, changing it in a gently collaborative way – there's another person in that reflection process, which leads towards a different kind of science

    - You can put particular people and goals in, and that would shift the location of these things
    - Another dimension we played with is whether you take the scientists out of their domain, or meet them there (e.g., toolbox or CTA taking scientists out of the lab into a different kind of discussion; versus STIR meeting them directly in the lab)
- Did also have a quick one on means/method
    - Two dimensions – proximity to the lab
    - Also attempt at the duration – hours (toolbox), days (CTA), months (STIR)
- Michael: struck by calmness of Britt and Katie, we don't want to make overreaching claims about what this is; important to think about what integration is not, and what it can be confused for
    - Erik: Completely agree – don't want to alienate people
    - Interaction, intervention, etc
    - Michael: This group can bring some caution and clarity to using this term
    - Erik: And some heft and raise the bar
    - Shannon: Sociotechnical reflexivity studies
- Erik: we also need to avoid turning off policy makers and scientists
- Sharon: question about the users, we have different methodologies to do this integration – it's important to define what we mean by integration; came up with the notion of spectrum of integration; we also talk about different integration methods applied to different technologies; plus, the culture of the users influences how much you need to integrate (e.g., scientists don't want people to tell them how to integrate). So, who are the users of these tools, and how are they going to be applied to different technologies? And, we're doing a lot of social experiments and don't know the outcome of how this works, so it's important to document both successes and failures at doing this.
    - Erik: STIR has outcomes, toolbox has studies, CTA sort of has outcomes; SEE has outcomes galore; all of these are well documented – we can begin the assessment, and keep looking forward – that's part of the call, also part of the basis of the report
    - Erik: I don't want to narrow down which technology uses which tool
    - Mike: Once we have a suite of integration methods and tools, we'll have a sense of where some work best; but, we're a long way off from that
    - Erik: Some methods will enroll people, other people will find methods – we're trying to develop a space where we can be more cognizant of the methods around us, trade in discussions, methods, and results; so report needs to take stock of where the field is, and here are some gentle guidelines and suggestions for moving forward
- Michael: What Mike said about the trading zones (that it can be operationalized in a more proactive way, where it can be mobilized as

another tool), while I agree that isn't not a good idea to limit us, but using that way to think about trading zones, it seems that all of these communities have the goal of affecting the lives of practicing sociotechnical potentials. These five all have an ability to make a difference in their lives. One kind of report would be a geography of this type of integrative facilitation, a kind of GIS for integrative facilitation.
    - Erik: This can be a section towards the end, but I wouldn't lead with that – we don't want to tell you 'we'll tell you where to go for what you want'; very much like probe, decide, move forward, and use it to suggest a topography with broader categories
    - Michael: Just thinking about report structure, if you're thinking about a stand alone piece, it's one someone could write in a day or two days. Puts this group in a unified position to speak as one to funding agencies.
- Mike: on engagement, there are a large group of our colleagues that are more concerned about improving their own fields internally; I think these engagement projects are one way of feeding things back into the fields that they come from

To say at end:
Thanks (10k words, 30pgs)
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