Breakout goals

Phill Conrad

- Why did I start?
- Term after term, I was doing tedious search and replace to update stuff for each semester
- There must be a better way -> I could DRY up my curriculum using variables (Jekyll templates) to produce GitHub Pages
    - Side benefits: audit trail, shareable with other people
- We now have all our lower division courses in this system
    - Whenever we teach these courses, we can mix and match assignments from multiple instructors and combine them into a coherent course
- Pain point: I hate search and replace
    - Tool: Jekyll template

Sean Bonorose Hoffman:

- I have a similar situation. We had a fcauclty member teaching the same course every time, and had to reuse the curriculum.
    - So he used GitLab, based on CI (Jenkins), make the process, make the variable inputs (templates)
    - 3rd Generation
    - But hitting scale issues
        - Not hardware
        - We have 4 classes, 3 instructors, minute differences, how do we sync up?
        - We have it as a senior project every year so we can keep strengthening it

Clifford A. Shaffer

- Thinking about aspects of this
- It’s an idea who’s time has come
- I’ve heard the need from different quarters
- Metaphor: Teaching a course (the living effect) is kind of like a living breathing animal
    - When you star the process to teach a course teh first time
    - When you go to the internet, and search for a topic, that’s like a bone, and you found it
    - When you find all the topics, did the searching, you have a pile of bones (artifacts)
    - Even with the pile of bones, you don’t have a full living breathing animal
    - The next step, you make a description of the course as a bundl of artifacts
        - The calendar
        - The assignments
        - Their order
        - And that’s the skeleton
        - And it’d be a huge advance if you are able to package skeletons

    - But a skeleton is not an animal
    - Here's a future problem:
        - Even if you have a full skeleton, with all the lessons in the right order
        - There's all this pedagogy
            - Flipped classroom?
            - Lecture mode?
            - Some of that is exposed via the project, but that's just an implication
        - These are the muscles and skin and organs
        - If you could capture all the pedagogy then you've got the full animal.

Josh (Code.org)

- Work in K-12 curriculum dev for Code.org
- That's where we're at right now
- We have the curriculum, we need to schematize our pedagogy
- We have custom markdown renderers
- We can write stuff at scale and have everything tied in with standards and stuff but
- A teacher can't really make changes
    - Because of the way we built our system
    - Cliff: Because of the interface? Because they aren't allowed to
    - Dirty background: we have a single instance where we publish our one static version
        - Our teacher population is not comfortable with GitHub and Git, although maybe they can grow a little more into it
        - We need high accessibility

Phill Conrad

- One other thing that we discovered
- At least in the context of university courses, we found we have two kinds of content associated with a course
    - Content like a really good set of lecture notes or slides or narrative
        - Constant, lasts forever
    - Content like a programming assignment with a deadline
        - Ephemeral, chagnes with instructors
- We found it helpful to separates these things
- So some stuff is shared, and some stuff is variable (syllabus, deadlines, outline of lecture notes).
- If possible we reuse things, and have a shared pointer back

Rune (Greenwich)

- Two types of packaging here:
    - The whole course with all the assignments
    - Smaller package of stuff, like a "Lesson on SQL Queries"

- Challenge is the reuse and sharing the context - how do you know if it fits with the programming language, and the tools, and so on
- Not just the pedagogy, but the context

Phill Conrad

- In the k-12 context, there are state standards for the topics
- In the university context, Cory and I have talked about good Curriculum Design where you start with learning objectives and build your materials based on that
    - Tagging questions written in Markdown (not shown to students) that can let you auto generate evaluations and reviews
    - Rune: and help link stuff around

Sean

- ABET accreddition wants this kind of stuff, they need small examples of questions aligned with learning objectives

Luke Gusukuma

- How do you incoroporate the Instructional Design?
    - The population, the learning objectives, how do they get broken down, and get those related performance tasks
    - How do you automate that so that when you can go from “student performance” on assessments to results

William

- I’ve been trying to code this
- One of the harder things is the hidden links of the material representing the context
    - “Last week we talked about this”
- I don’t want to sterilize my curriculum when I do this

Luke:

- In proper ID this should happen: you have dependencies on learning objectives and can establish a DAG of required knowledge
    - Entry skills
- Rune: Dependencies are circular, sometimes you have to express going back and forth on tasks
- Luke: You might just need to break down the objectives again
- William: Sometimes it’s not formal, sometimes it’s a more casual example that you can’t really capture.
- Rune: Sometimes you have variable ordering of topics from year to year
- Sean: We dont’ cover topics once in a curriculum, we sprinkle it in among many courses
    - Curriculum design is macro course design

Samita

- Automatic evaluation of the material - but I wonder why you need it?
    - Are they really meaningful comparisons
    - Sometimes evaluations come out differently based on the audience
    - What is the benefit then?
- Cory: Basically, you have to track your learners to contextualize the data
- Does require you to collect sruvey data
- Luke: advantage of collecting data in progress through the semseter, not just at the end.
- Phill: I can look at data and find out “THey did well on #9 and #15 and bad on #6 and #7”, and I’d rather look at a higher level and find out “All the problems were with Polymorphism”. Gives me more insight faster

Luke

- I wrote a SIGCSE paper about Instructional Design, it can help explain some of this and give guidance for how we broke down stuff.

Samita

- We use Moodle, I can just copy the course verbatim, change a few dates. This is pretty covnenient, actually.
    - But the time to change the rubric and syllabus can be a little troublesome
    - This covers most of my cases

Steve Bittner:

- I’m a software engineer, I want to version my stuff - I would never not do that
- I hate that about Canvas that doesn’t allow me to undo stuff
- Almost everything can be submitted via JSON
- So I started using the JSON format to make my quiz

Rune:

- It’d be nice to have a package diff tool to be able to compare these things
- Josh: I actually tried to make one of these
    - Turns out its way too granular
    - You need more context about the why of a change
    - Steve: If everything is flat in a repo, maybe you can see things more easily
    - Luke; Might need to adderss giing this context

William

- Talking about Samita’s experience
- When we need to clone stuff for other schools
    - Some educational assignments are actually moodle rankings
    - Sometimes we have to bring in new changes from the moodle clone
    - Some tools have meta-information (how things are presented and oragnized and stuff and look) that need to be merged and updated.

Sean:

- What’s the point where we leave the policy out of this project
- How pushy should we be?
- Some stuff is just instititutional, and we don’t want to necessarily force things around

William

- Some people want to make chagnes to our “runtime environemnt” of our course

Juho (Helsinki)

- We have this one course that moves around, sometimes we teach it differently ddepending on the audience (majors vs minors vs MOOC)
- How do we individualize based on the version
- It’s a lot more complex when you have many different versions of the content
    - Should you have two different courses? What if you have ten subpopulations?
    - How do you package that?
    - What about cultural differences?
        - We have an English version, we have a Finnish version
        - So now we have internationlization issues
    - Should we have student modeling
    - Suddently that can be very context heavy - and may seriously affect the variables

Steve:

- In the web dev world, you’d have templates with partials
- Juho: We have a github for the assignments - should we have different repos for those different assignments? Extra assignments, modified assignments?

Bob

- At what level are we talking about pacakging mateirals?
    - Course level?
    - Conceptual Level?
- It makes a difference, especially in terms of reusability
    - Course level may only be recyclable at the instititution
    - Conceptual level may be something greater, allow you to pick and choose and build courses from that material
- I taught Software Engineering last fall
    - The material in teh course covers a lto of conceptual ground
    - But the course wouldn’t be useful to other insitutions cause it’s a VT specific course
    - But there are pieces that are probably useable elsewhere
    - It’s almost like we need to focus on a level of abstraciont at the conceptual level
        - We need some tools that adapt/pcakge them to moodle and canvas

    - Addressing Steve: I was thinking about your tools, and all the work you put into them, and what happens if your insitution changes its LMS - what happens to those tools? The storage platform has to be agnostic of the platform

Josh

- Thinking about smaller chunks, makes it critical to codify the learning objectives and outcomes
- If youd don't know the prerequisites and coverage of a lesson, you can't really figure it out.
- Packaging a small piece has to start with that
- Start with learning outcomes

Bob

- I throw it out there for consideration, I go back and forth
- The course approach is easier to do
- The conceptual approach has more durability

Luke

- When we talk about conceptual stuff - We appraoch the difficulty level of "Concept Inventory"
- Bob: we don't have t oagree, we just need to be able to codify it
- Sean: when we teach SE, the books tend to be out of date very quickly. The course material needs to be flexible with time, and some course material may be static but still needs to evovle with new algorithms. It'd be nice to have a common pattern of hwo to do variations.

Motivations

- Samita: If it taught me how to gather common misconceptions, and be able to improve my materials. Not for packaging, just for misconception gathering. It'd help for revising and evaluating.
- William: Many people at my insitution would be happy to package their "wares". Teh toher end of using the packaged materials is harder - it's easier to write code than to read it. Navigating that sea seems overwhleming. There's an activation energy necesary - I have some code that I wrote. The reason I haven't published my own stuff is because the univesrity wil require me to use Moodle. So I need to focus on getting it ready for deployability to avoid making more work. It also runs against my own incentives to generate material rather tha nbecoming a content aggregator. It's easy to convince me to publish materials, it's easy to convince me to package my materials.
    - But on the other hand, I don't want to shhift to being a curator
- Sean: We havea common reuse problem. Some problem are happy to reuse a program or an element of a program. But when we think about "a generator to produce this". The top-level organization migth like this, but the individuals have to sacriffice time and

energy and the payoff might be good but not be. Our stuff may run into the same pattern. I'm a code reuser at hte small level, not the big level.

- Steve: What if ti's not necessarily sharing courses? I'm more interested in having to teach this class again this semseter. Even if it's not the course content I'm sharing, if it's just some establishment of a durable format that I can click a button and upload it with only small modifications. That might be a good pitch for some people, to avoid the work of having to redo it. <Gave good example of a tool for canvas that makes it easier to copy/change rubrics> Might just be enough to provide a nice structure to this stuff, and then a common script that spits this stuff into an LMS (easy way to ingest). I just started teaching in the fall, so 3 professors shared their previous canvas shells - a whole ton of junk to process and figure out what parts I want (need to review the individuals and weight their content)
- Rune: After a lecture, I make notes about stuff and want to keep track of this stuff.
- Steve: If it's in the repo then you can carry it forward. One of the problems with the cloning model, is taht you dont' necessarily get to propogate your changes.
- Rune: I like to do my changes right before I teach, so it's fresh in my mind. I don't want to think about it until I'm running.
- Josh: So you open an issue for yourself in the repo

Samita:

- So you're still working on this? What's tools are on your mind

William:

- How do we do community ownership of a protocol/standard?

Luke:

- There's some use in getting people to talk in person - having dynamic dialogue (e.g., over the phone)

Summary:

- What's the next steps?
    - Google form that gathers a bit more data
        - E.g., user requirements
    - Google doc standards as major next phase
    - Video conference meeting as follow-up
        - Schedule at some points so we can have dynamic conversation
    - There's an awful lot of stuff - we're gonna focus on the things we can make progress on initially. We'll tackle what we can tackle. We're gonna make a good first attempt, it doesn't have to be final. Let's aim for a minimal viable product.