SYSTEM INTEGRATION, DEVOPS, FEASIBILITY STUDY SUPPORT

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AGENDA

- Overview
- DevOps walkthrough
- Workstream Integration
- SAGE Feasibility Report
  - Quest Walkthrough
  - Survey Analysis
  - Reference Diagram

OVERVIEW

Our focus this semester was integrating the various researcher workstreams through DevOps, researcher workflow management, development of SAGE's Quest sets, and facilitating research and authoring of the Sage Feasibility Study in preparation for publication.

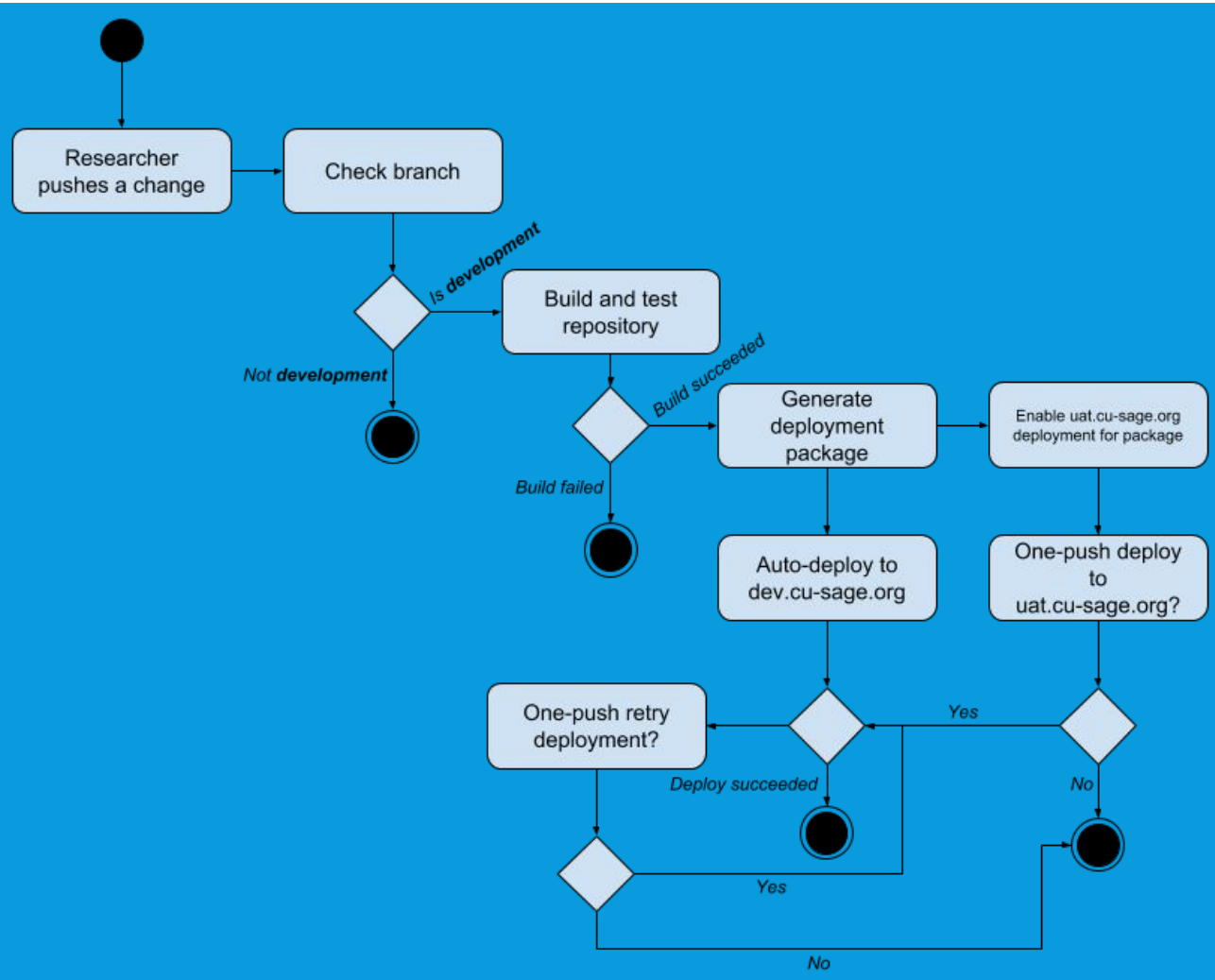
We believe this focus has helped the team create a demo-ready version of SAGE and developed the SAGE environment and project structure for highly efficient research in future semesters.

DEV OPS: WELCOME TO SAGE!

This demo will push a commit that updates an endpoint that allows an “invitation” email to be sent from SAGE.

DEV OPS

- VCS, build, release, test, and work breakdown structure all hosted in a single TFS platform.
- Commits to the "development" branch automatically built and pushed live.
- Tests run as part of the build process.
- Test coverage infrastructure is available (not enabled).
- "GitFlow" workflow management supported by VCS, build, test, and deploy systems.
- **Build automation via Gradle and Gulp integrated into all repositories**
- **Self-hosted SMTP functionality allows SAGE to send class invites and other notifications.**

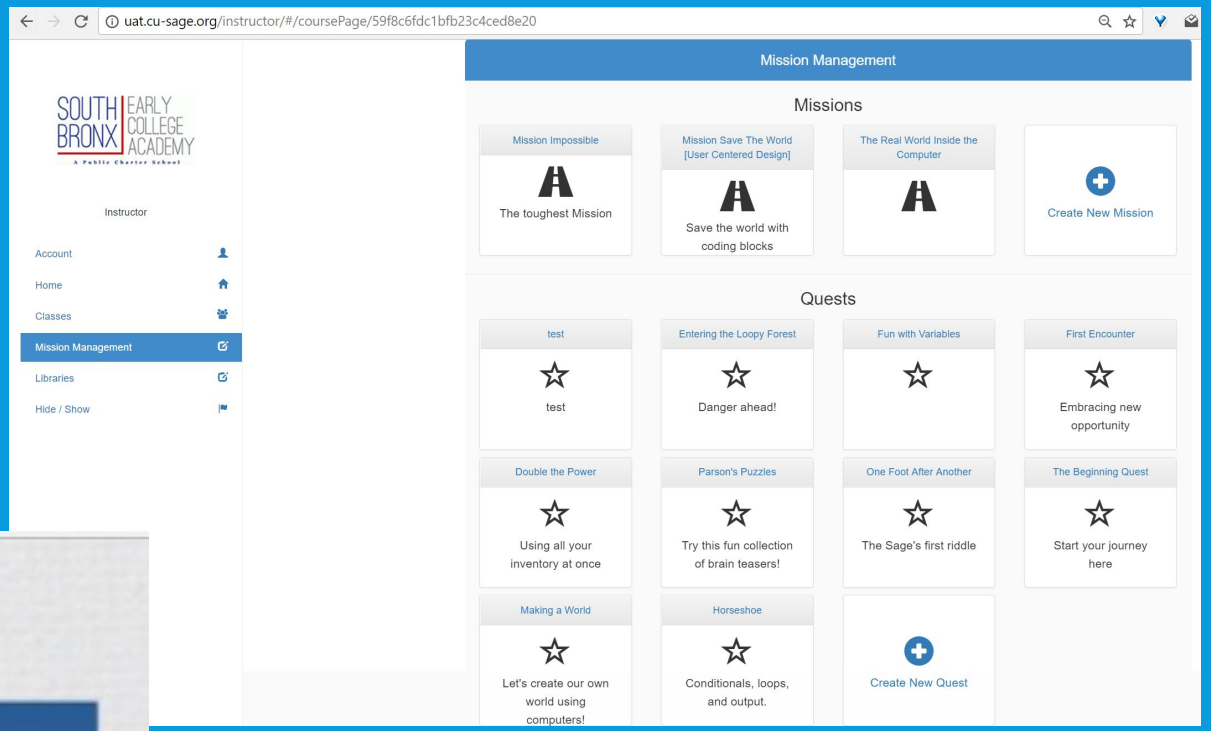


DEV OPS: LIMITATIONS AND FUTURE WORK

- UAT deployments are manually triggered. **Find an optimal UAT build schedule and push "N-day'ly" builds.**
- DevOps doesn't support local development environments. **Implement configuration management**.
- Testing API endpoints is cumbersome. **Integrate Newman (Postman CLI via Node).**
- Test coverage is lower than optimal. **Target >=75% test coverage.**

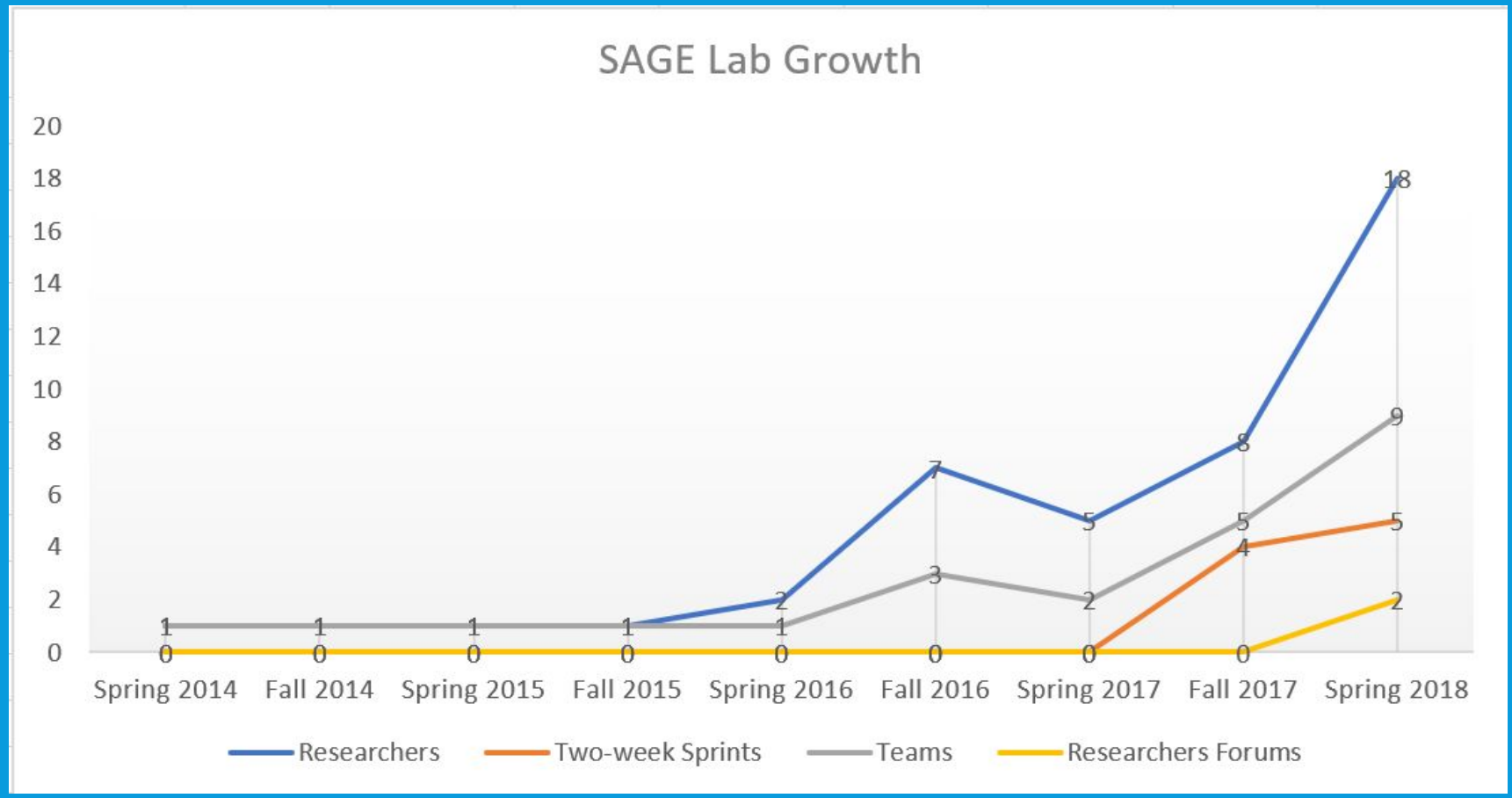
WORKSTREAM INTEGRATION

- SAGE successfully moved from local versions to a persistent, online instance early in the semester (dev.cu-sage.org), later duplicated into a second instance (uat.cu-sage.org)
- This operating version has been used to support user-centered designs throughout the semester



WORKSTREAM INTEGRATION: TEAMWORK SUMMARY

SAGE continues to draw increasing interests from researchers as its field studies platform is coming together…

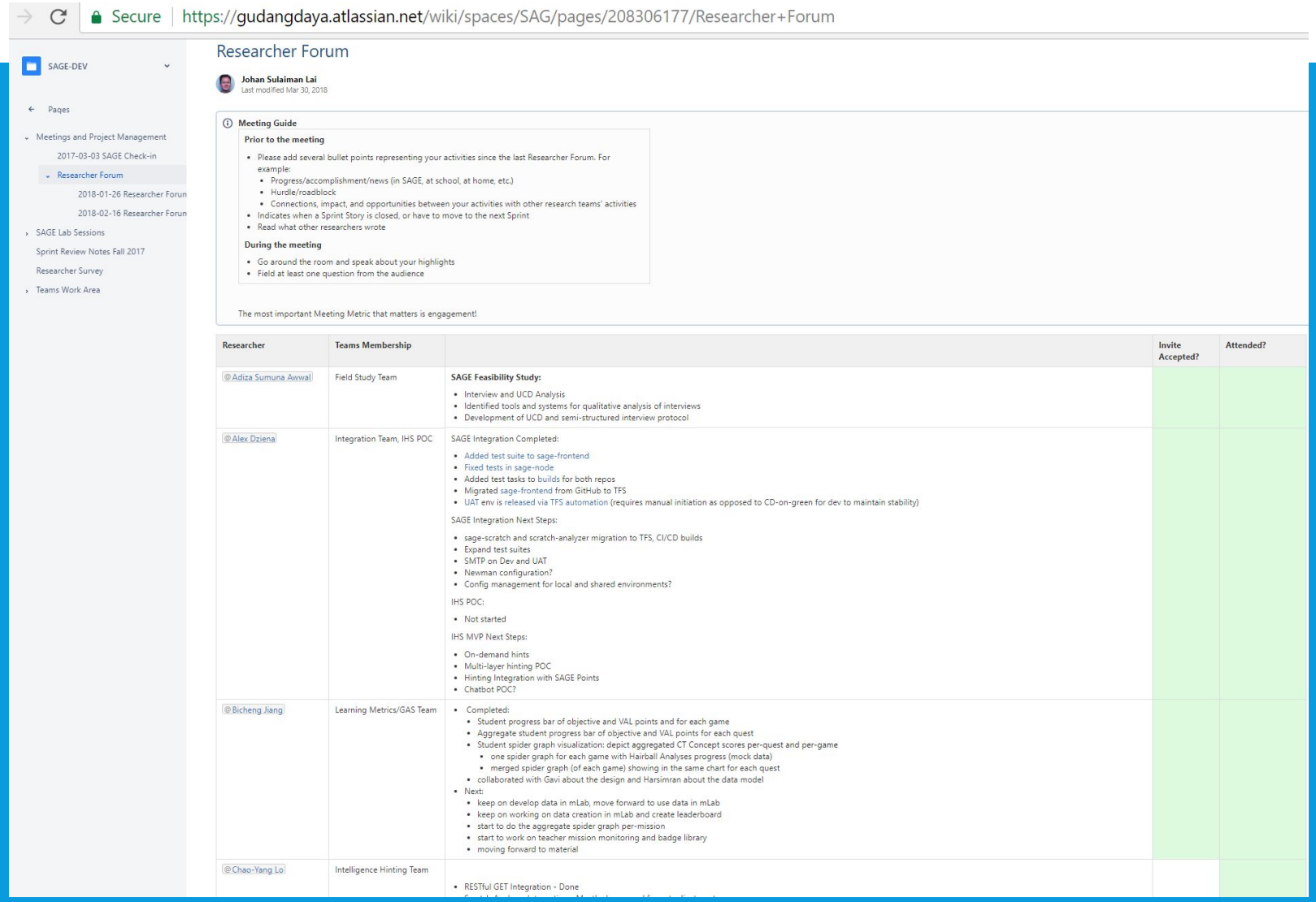


WORKSTREAM INTEGRATION: TEAMWORK SUMMARY

… which necessitates effective written and real-time communications among the growing team members. In Spring 2018:

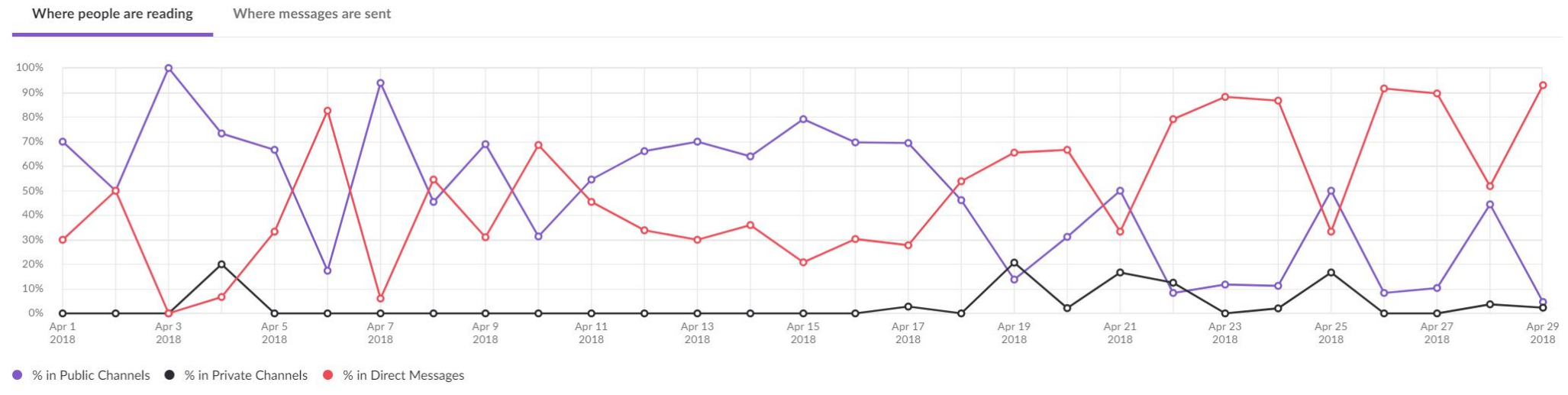
- 27 new SAGE Wiki PDF pages added, now at 110 pages
- A new Developer only Wiki created, with 20 additional new pages added this semester
- Greater utilization of Slack, now with 9 active channels
- Researcher Forums memorializes bi-monthly progress in the form of Wiki pages

- Observably more iterations and engagements supported by increased tools utilizations



SAGE DEV WIKI SPACE

WORKSTREAM INTEGRATION: LIMITATIONS AND FUTURE WORK



- What could be better: more utilization of Slack general channel to announce team's progress and feature updates, to cross-pollinate information
  - Automatic message posting to Slack with every TFS build could be effective
    Commits are not tied to work items.
- We should update the researcher workflow to include work item IDs in commits (supported by TFS)
- Work could be more visible across the team. **Integrate shared demos announcements.**
- Some SAGE use cases aren't documented. **Create a use case / user persona inventory to guide future work.**
- Project management methodology is not fully formalized. **Build a project schedule for research in future semesters, with regular deliverables**

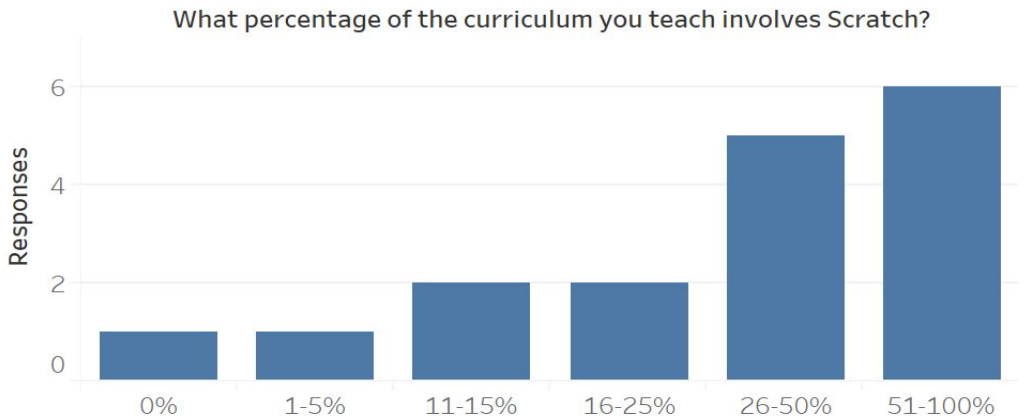
SAGE FEASIBILITY STUDY RELEVANT WORK

- Recent researches (Lee, et al 2013; Ihantola et al, 2016) show there is a continuing shortage of work on data-driven educational technology in general and in-game assessment specifically. This is due to several factors (Evans, 2012): 1) Current programmatic limitation still exists when it comes to distilling meaning from language, so free-form answers are difficult to interpret and assess, 2) a highly effective teaching method is debriefing, but this is challenging to administer, 3) there is a recognized higher risk for students to game or cheat the system. Another research (Harteveld, et al 2014) further boosts motivation for that the space for an educational game that teaches Computer Science or Computational Thinking is still wide open and fertile for new research
- [Mannila, et al 2014] There are nine CT aspects described by the CSTA/ISTE (**data collection, data analysis, data representation, problem decomposition, abstraction, algorithms, automation, simulation and parallelization**), these are the CT aspects that are also included as part of the survey.

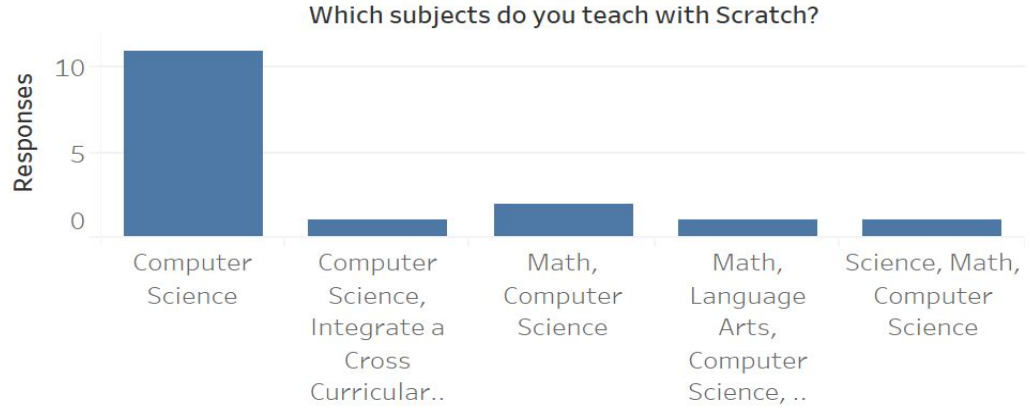
SAGE FEASIBILITY STUDY: Demographics (TABLEAU)

Experience with Scratch

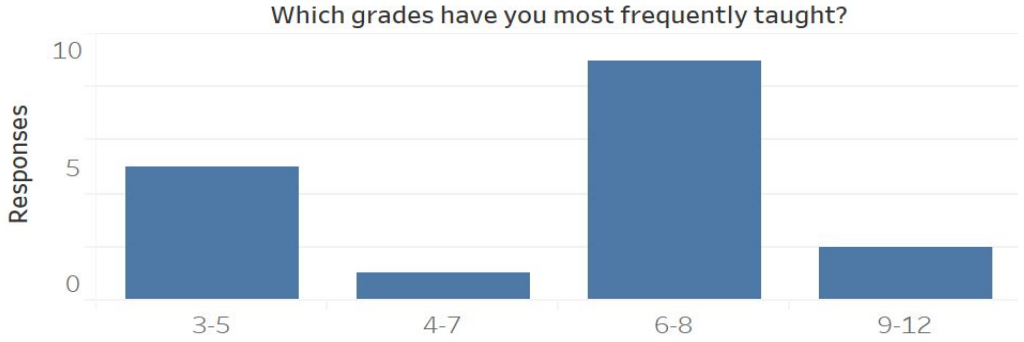
Share of Curriculum



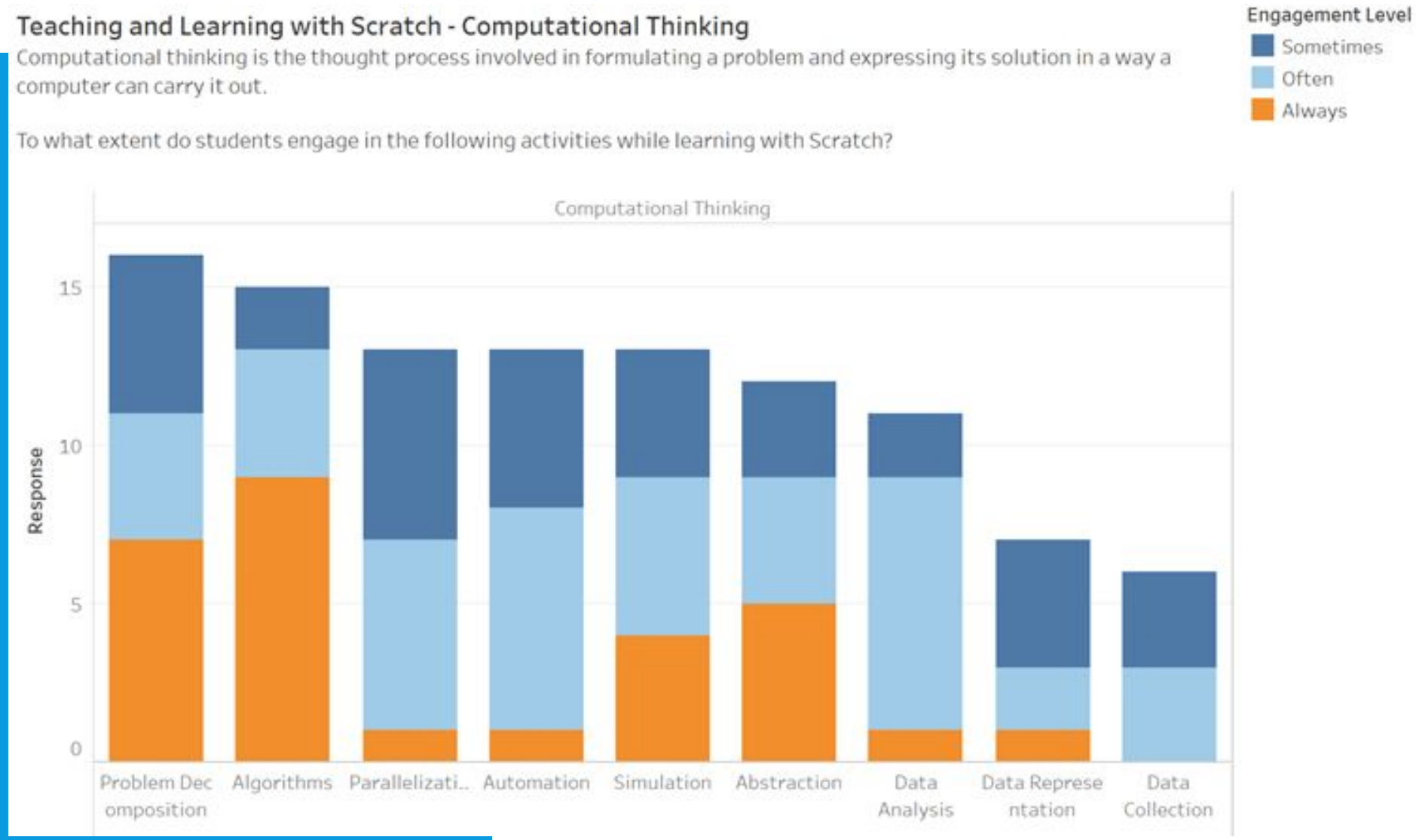
Subjects



Grades



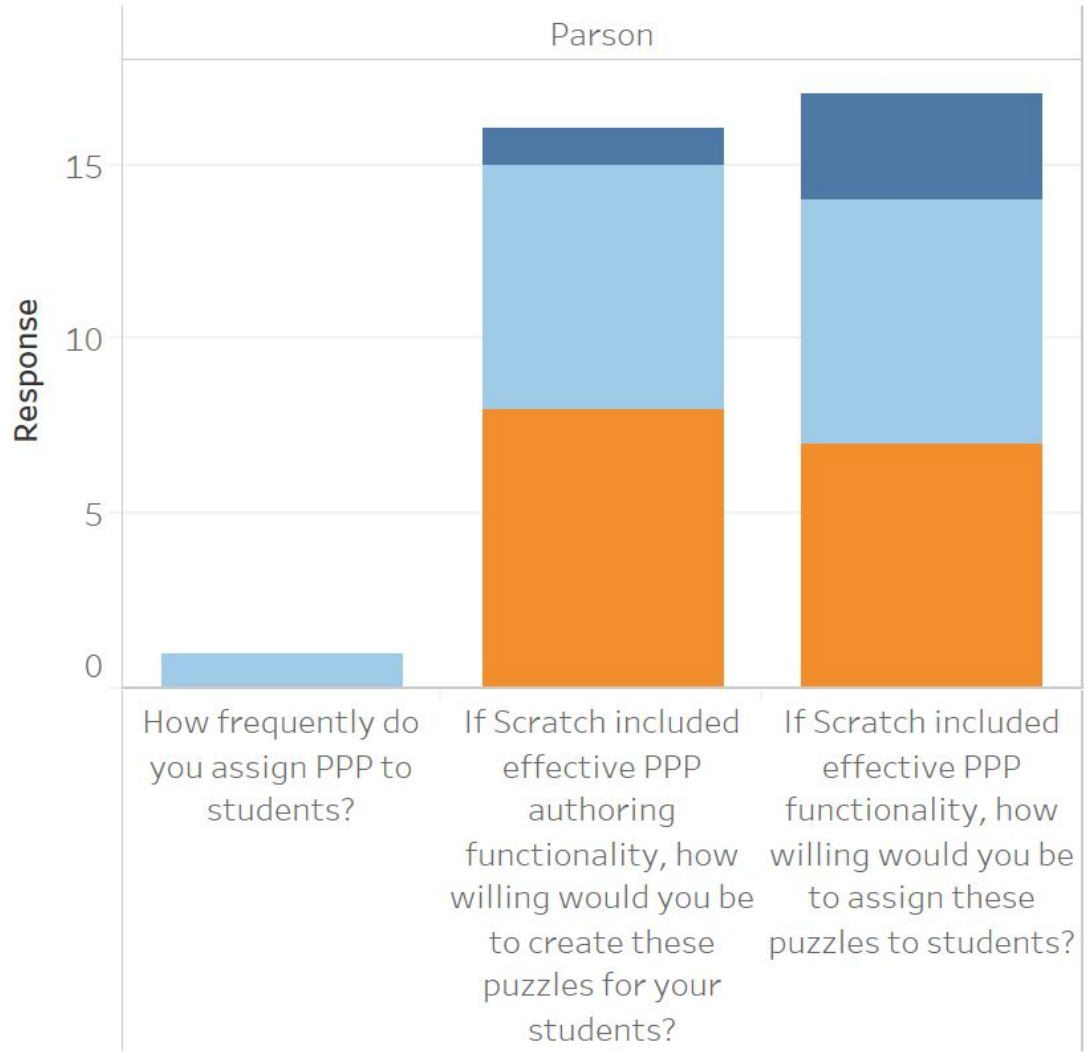
SAGE FEASIBILITY STUDY: SURVEY ANALYSIS (TABLEAU)



SAGE FEASIBILITY STUDY: SURVEY ANALYSIS (TABLEAU)

Teaching and Learning with Scratch - Parson's Programming Puzzles

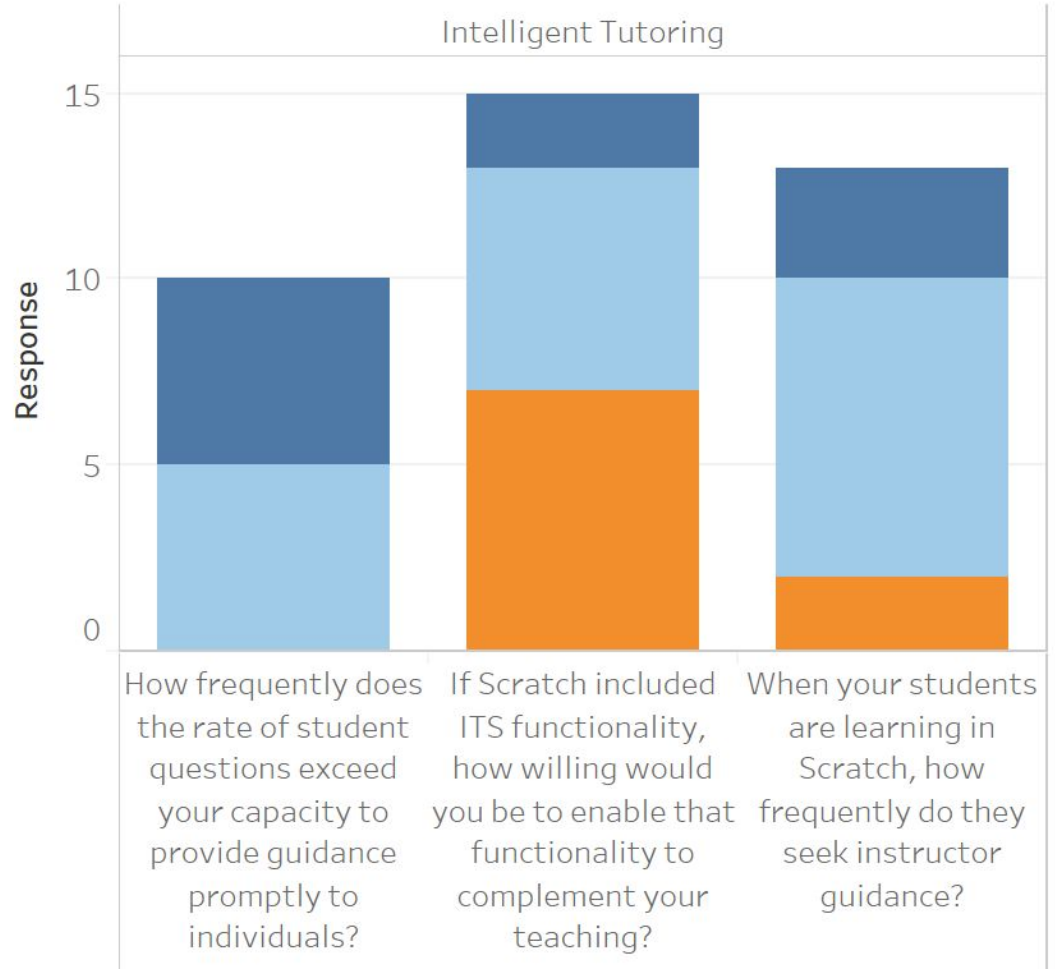
Parson's Programming Puzzles (PPP) are a family of code construction assignments in which lines of code are given, and the task is to form the solution by sorting and selecting the correct code.



SAGE FEASIBILITY STUDY: SURVEY ANALYSIS (TABLEAU)

Teaching and Learning with Scratch - Intelligent Tutoring Systems

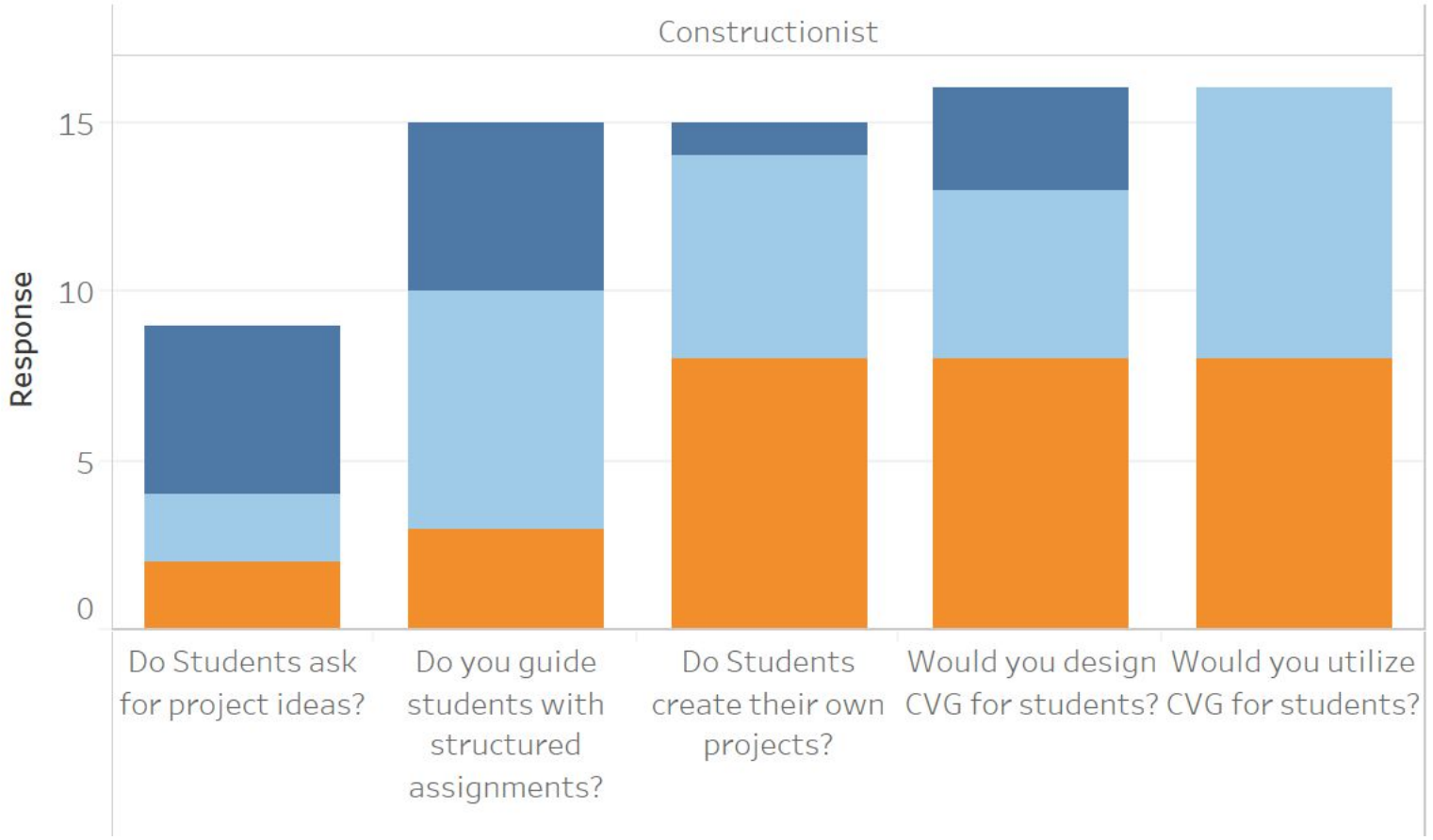
An intelligent tutoring system (ITS) provides immediate and customized instruction and feedback to students by a variety of delivery mechanisms such as just-in-time hints, on-demand information, and next-activity selection



SAGE FEASIBILITY STUDY: SURVEY ANALYSIS (TABLEAU)

Teaching and Learning with Scratch - Constructionist Video Games

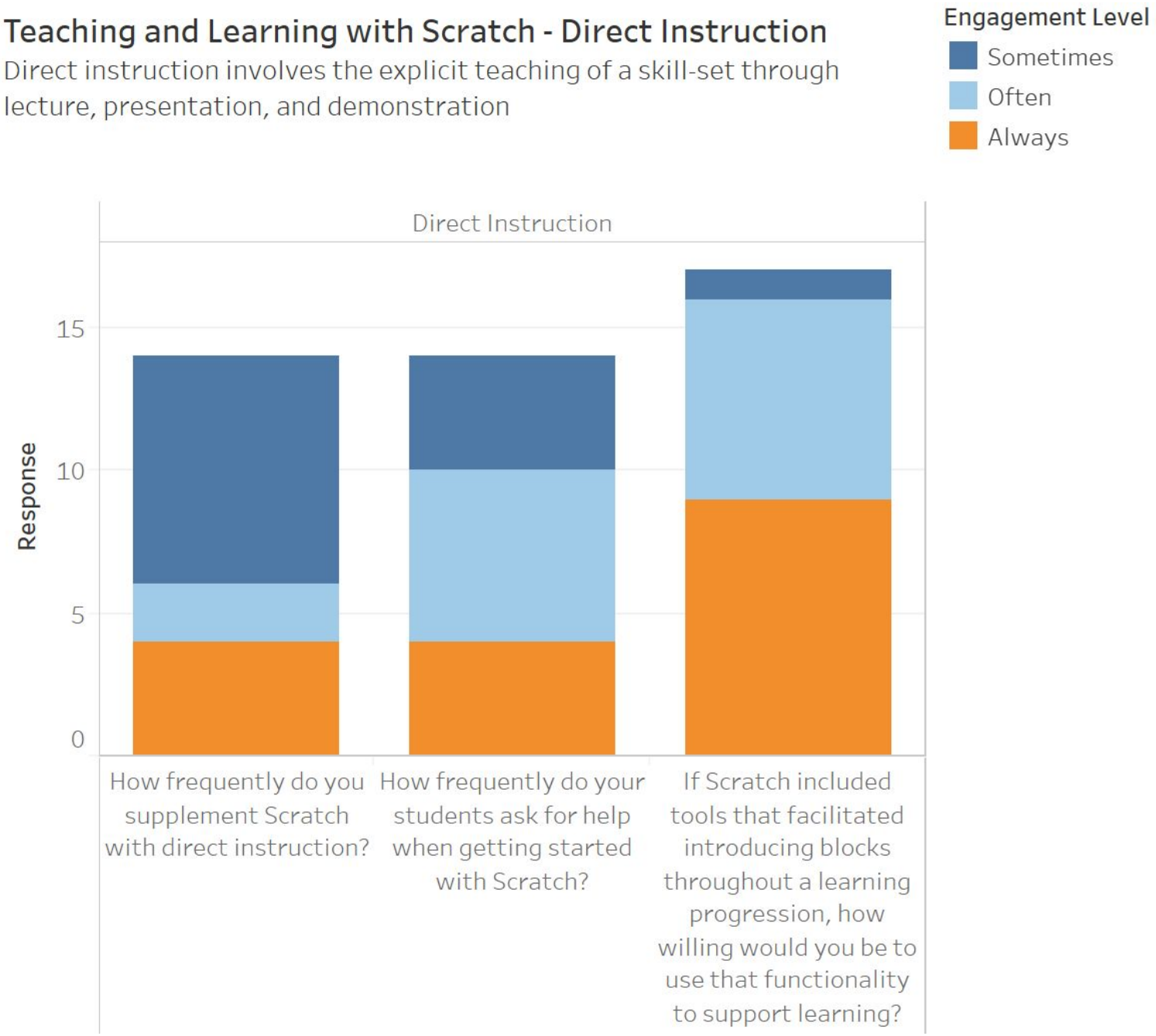
Constructionist Video Games (CVG) are designed environments in which players construct personally meaningful artifacts in order to overcome conflicts or obstacles resulting in quantifiable outcomes.

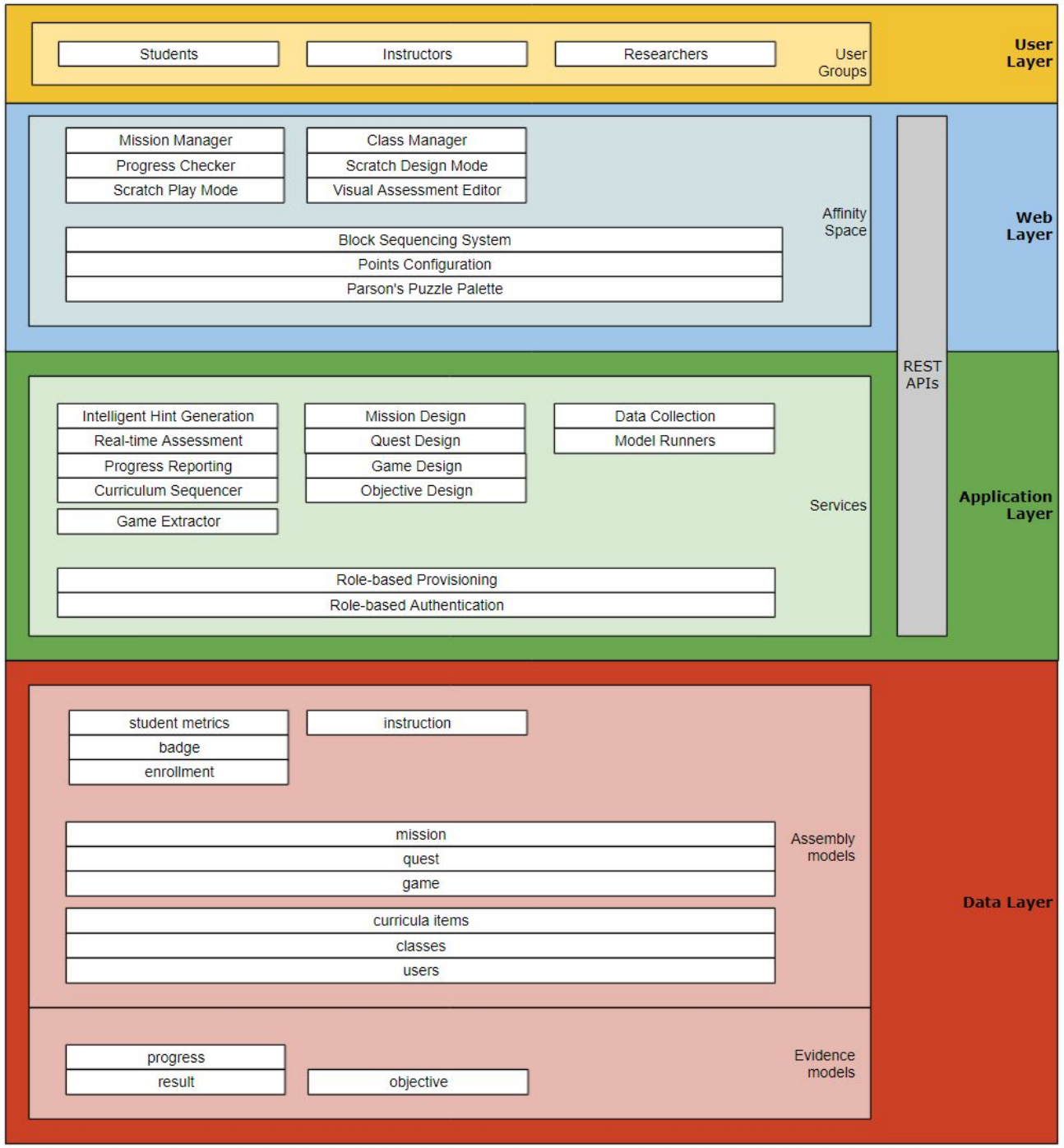


SAGE FEASIBILITY STUDY: SURVEY ANALYSIS (TABLEAU)

Teaching and Learning with Scratch - Direct Instruction

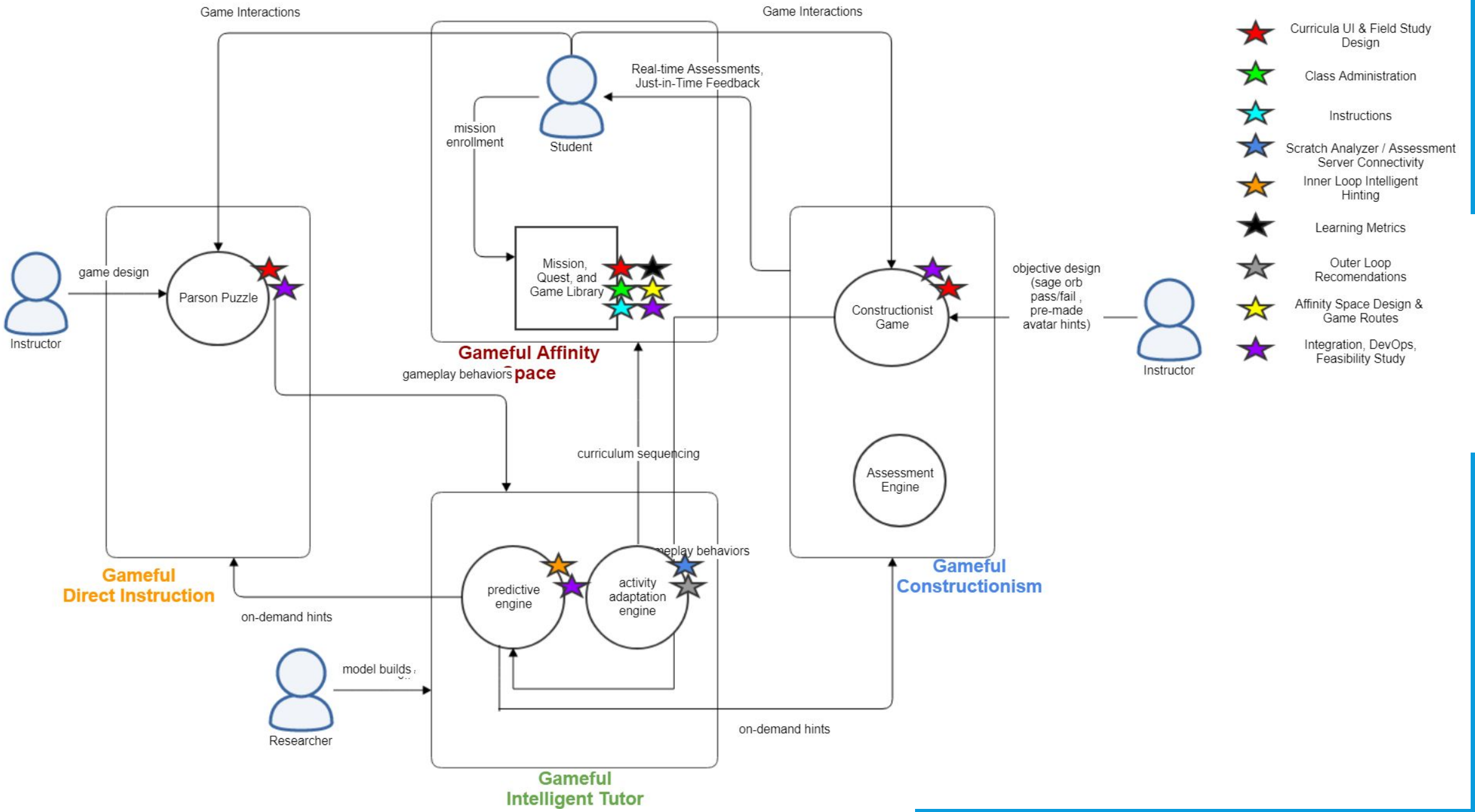
Direct instruction involves the explicit teaching of a skill-set through lecture, presentation, and demonstration





SAGE FEASIBILITY STUDY: REFERENCE DIAGRAM

SAGE Software Tiers

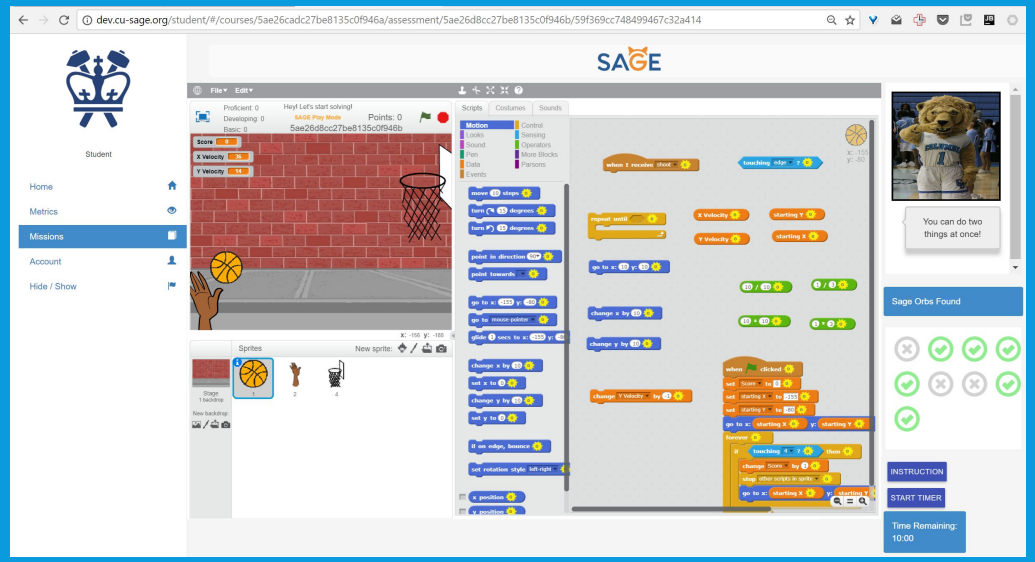

Game Interactions
Game Interactions
Real-time Assessments,
Just-in-Time Feedback
mission
enrollment
Student
Curricula UI & Field Study Design
Class Administration
Instructions
Scratch Analyzer / Assessment Server Connectivity
Inner Loop Intelligent Hinting
Learning Metrics
Outer Loop Recomendations
Affinity Space Design & Game Routes
Integration, DevOps, Feasibility Study
game design
Instructor
Parson Puzzle
Mission,
Quest, and
Game Library
Gameful Affinity Space
gameplay behaviors
Constructionist Game
objective design
(sage orb
pass/fail ,
pre-made
avatar hints)
Instructor
curriculum sequencing
Assessment Engine
Gameful
Direct Instruction
predictive engine
activity adaptation engine
gameplay behaviors
Gameful
Constructionism
on-demand hints
model builds
Researcher
on-demand hints
Gameful
Intelligent Tutor

MAP SPRING 2018 TO SAGE ACTIVITY FLOW

Project	Team	Epic(s)	Feature(s)
Curricula UI & Field Study Design	Adiza Awwal, Lalitha Madduri, Mahzabin Hasnath	• Gameful Direct Instruction • Gameful Affinity Space • Field Study Design	• Parson's Puzzle Library • Curricula Integration • SAGE Feasibility Study
Class Administration	Harsimran Bath, Yuval Schaal	• Gameful Affinity Space	• Class Administration
Instructions	Jen-An Lien, Yuval Schaal	• Gameful Constructionism	• Constructionist Game Library
Scratch Analyzer / Assessment Server Connectivity	Chao-Yang Lo	• Gameful Intelligent Tutoring	• Programming Behavior Detection 1.1
Inner Loop Intelligent Hinting	Yi Ding, Weimeng Luo, Junyu Zhang	• Gameful Intelligent Tutoring	• Intelligent Hinting 1.1
Learning Metrics	Bicheng Jiang, Jiaying Yang, Lillian Zha	• Gameful Affinity Space	• Learning Metrics
Outer Loop Recommendations	Harsimran Bath, Weiman Sun	• Gameful Intelligent Tutoring	• ITS Outer Loop
Affinity Space Design & Game Routes	Gavi Rawson	• Gameful Affinity Space • Gameful Constructionism	• Game Mechanic Blocks
System Integration, DevOps, Feasibility Study Support	Alex Dziena, Johan Sulaiman	• SAGE Integration • Field Study Design	• Workstream Integration • DevOps MVP • SAGE Feasibility Study

SAGE FEASIBILITY STUDY PROTOYPE & FUTURE WORK: CREATING AND USING QUEST SETS

- Quest 1: The Beginning Quest
  - Parson Puzzle 1-1: Basketball
    - CT concepts: Algorithm, Abstraction, Simulation, Automation, Parallelization
  - Parson Puzzle 2-2: A Square Remix
    - CT concepts: Algorithm, Problem Decomposition, Abstraction, Simulation
  - Constructionist Game 1



DEV OPS: WELCOME TO SAGE, CONT'd!

Can we receive an email from dev.cu-sage.org?

DEV OPS: RELATED WORK

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WORKSTREAM INTEGRATION: RELATED WORK

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SAGE FEASIBILITY STUDY: RELEVANT WORK

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