

Case Study

A Producteering Approach to Modernization of an Educational Search Product



Summary

A leading provider of educational search software wanted to modernize their search products to accommodate growing business needs. Aspire took a Producteering approach to completely re-engineer their product, and brought in significant value-addition on the technology and process fronts, as well as on their overall product development efforts.

Customer

The leader in the delivery of digital K-12 educational content with a mission to help every child learn, through highly effective technologies. Their product is the No.1 educational search tool in K-12 schools, is used in thousands of schools in the US, and serves millions of students worldwide. They have been honored more than 25 times for their contribution to education, and were named the Best Education Solution in SIIA's CODiE awards.

The Need

The customer's standards-based educational tool was the first in its market when it made its entry, almost 8 years earlier. Since then, the technology and the architecture of the product needed an overhaul to accommodate growing business needs such as:

- Real time publishing
- Internationalization
- Branded product interfaces for different geographies
- Content & account management
- Integration with other products and contents
- Student productivity tools

Hence, they wanted to modernize their product with newer, robust and extensible technologies and architecture. They were looking for a partner to work with them as an integrated team and mentor them on new technologies, processes and best practices.

Our Solution

Working as an agile integrated team, and with the customer's strict pre-fixed time schedule in mind, Aspire:

- Developed a new search algorithm for optimum search results
- Reduced indexing and content publishing from a 3 month timeframe to real-time updates
- Enabled multi-tenancy
- Designed and developed an extensible content workflow framework as part of modernizing the search product

"When we were looking for a development partner, we were attracted by Aspire Systems' "Producteering" messages. We were concerned that many offshore groups were too "project" focused and didn't understand the nature of agile product development. It was essential that we found a "partner" who could work closely with our product management and development teams to design, build and maintain our SaaS solutions. We found that in Aspire Systems. "Producteering" was more than a slogan. They've been a "true" development partner."

- **VP-Solutions Management & Development, Educational Search Product**



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Aspire also designed and implemented a REST-based, custom-built framework and architecture for the product. Appropriate patterns and processes were developed and incorporated to ensure extensibility and scalability. We also brought in consistency in coding, implementation and deployment.

Some of the core principles/practices we followed as part of our **Producteering** approach:

- ✎ Management of the key variables: Time, Budget and Scope
- ✎ Frequent releases of working software (3 week cycles)
- ✎ Daily interaction between the onsite team (11 members) and offshore team (15-20)
- ✎ Result-orientation, instead of Process-orientation (rapid re-prioritization based on what worked, changes in the requirements/team etc. instead of sticking to a single defined process)

Technology/Tools Snapshot

Java, Restlets, custom-built framework for major architectural components, Eclipse, MySQL, Apache, Tomcat, SVN repository, Version One, Trac, Maven, Hudson, JQUERY, JSON, Ajax, Findbug, PMD

Critical Features Developed

- ✎ A **new search algorithm** was developed using the open source Lucene library and Solr, an open source search server, to obtain meaningful results for any search. This is the core component of their education search tool. Aspire also developed a custom scoring algorithm, considering various evaluation attributes, used by expert educationists, who hand-select content for various search terms.
- ✎ **Real-time** indexing and content publishing was made possible by making use of the Lucene indexing process and a custom-developed scheduler framework using Quartz libraries. In the old product version, indexing and content publishing took more than 3 months.
- ✎ To support **multiple tenants**, various abstract patterns were developed in the data layer. Business logic was delegated to the service layer and completely independent of the UI, so that customization of interfaces was possible for different geographies
- ✎ Appropriate **authentication techniques** for B2B communications to import content and integrate with external applications and products were developed.
- ✎ A **content management tool** was developed from scratch to evaluate and manage content workflow. Aspire played a vital role in working along with the Product Owner to conceptualize the various features of this tool. The final result was a customizable and extensible workflow framework that enforced discipline and quality in the evaluation and publishing process.

Examples of our Producteering approach

1) Management of the key variables: Time, Budget/Resources and Scope

Recommended practice: Flex at least one variable

The customer had fixed the scope of the re-engineering work and also had a firm release date committed for the modernized product version. Hence, they were open to flex the number of team members working on the project in order to meet their time and project goals.



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Since there was no detailed written documentation of the requirements and it was quite a large and complex product, it was difficult to determine upfront the exact number of resources needed at different times.

Aspire was prepared for flexibility in scaling up and down the team based on the exact resource requirements during the course of the project. This did bring in training and management overheads, which were handled by associating newly inducted members with senior team members as mentors.

2) Agile Processes

There were a few iterations, before an optimum process was found for the Customer-Aspire teams (11 members onsite, between 11 and 20 members offshore at various phases)

Some adaptations to the Scrum process based on the team's needs:

- ✍ Before a sprint (say Sprint X) started, there was a Pre-Sprint.
- ✍ A grooming session was conducted as part of the Pre-Sprint to iron out requirements to be developed in Sprint X.
- ✍ Any stories that required design or prototype were identified in the Grooming session and the tech leads and UI leads developed the same in the Pre-Sprint.
- ✍ The Aspire tech lead conducted an internal grooming to the offshore team on the first day of a sprint
- ✍ A planning session was conducted on the first day of every sprint with all the developers (onsite and offshore) to communicate the requirements to developers and task out stories
- ✍ At the end of the planning session, developers commit to the stories that they would complete for that sprint
- ✍ A retrospective meeting was conducted after the demo, involving the entire team, to understand what worked and what did not

What did not work and how we overcome those challenges?

- ✍ Adopting a 2 weeks Scrum did not work, as there was insufficient time for QA
 - We moved into a 3 weeks scrum and dedicated the 3rd week for QA and defect fixing. This also improved quality and reduced the number of defects introduced in a sprint.
 - Code freeze for a sprint was at the end of the 2nd week. Any stories that could not meet this date was moved to the next sprint and was not eligible for a demo in the 3rd week
 - Interim story demos are made to the Product owner in the 2nd and 3rd weeks, before the final demo, to capture any communication gaps.
- ✍ Initially, there was no sprint for defining the core architecture for the product; architecture was defined on-the-fly during the sprints and there was a significant amount of refactoring. This created problems in identifying and defining the core framework components.
 - Hence, we moved architecture out of the sprints
 - One sprint was dedicated to the development of the basic framework and architecture, which was tested, reviewed and signed off before


Agile adaptations/Lessons learnt:

- During this project, defining the architecture upfront to provide overall guidance was the best route
- Requirements, prototyping, UI were done in Pre-sprints; coding was done during the sprints.
- Refactoring was painful. Beyond a point, it caused quality issues and we avoided it. 1.36, MS Visio

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- This enforced patterns and coding standards across the entire team

 All the meetings in the agile process involved all the developers and this resulted in some loss of productivity

- Only the technical leads (from Aspire & the customer's end), UI lead, architect, product owner, QA lead and the scrum master was involved in the grooming meeting instead of involving the entire team
- The leads then conducted an internal grooming to bring the rest of the team up to speed
- Appropriate tools were used to log the stand up notes to reduce the time for stand ups.

Process/Tool Snapshot

Communication	Collaboration	Engineering	Metrics
Hotline between teams	Collaboration hub (Version One, Trac)	Continuous integration tools (Hudson)	Burn-down charts
Web-conferencing	Wiki	Single Source repository (SVN)	Velocity
Instant messaging	Discussion threads	Automated builds (Maven)	Technical Health index

ABOUT ASPIRE SYSTEMS

Aspire Systems provides end-to-end software development services to Independent Software Vendors (ISVs)/packaged software providers, Software-Enabled Businesses and Innovative Enterprises.

We are passionate about Producteering™ – our approach to creating software better and faster. It helps us deliver tangible business results for our customers through technology. Our key strengths are in the areas of SaaS, Cloud Computing, Web 2.0/RIA, Mobile, Test Automation, Agile/Scrum, and in the Healthcare domain.

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