

Online Assessment Platform Development Recommendations

Building the *Next Generation* Assessment Platform
– the Consortia Opportunity

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Executive Summary

The Common Core State Standards initiative and Race to the Top Assessment grants awarded to two consortia of states to develop the next generation common state assessment systems tied to the Common Core Standards provide an historic opportunity to improve the state of education and assessment in the U.S.

While the two consortia differ in how they propose to design and implement their visions of assessment systems, one common theme is that the summative and perhaps their benchmark, and through-course assessments, will be delivered by computer. This is a massive change from the current status of assessment in the U.S., where almost all students are assessed using paper-based assessments. Only a few states have managed to move all of their assessments online, so the extent of change that will occur in this decade is huge. To accomplish their designs, each assessment consortium will need to develop an assessment platform that delivers common assessments across the country.

Development of the next generation platform for delivering future assessments, if managed well, should result in a *transformative* change in the way assessment is thought about and delivered. Building such a system for the near-term and foreseeable future will be an extremely complex undertaking particularly with the quickly-evolving Education and Technology landscape.

An estimated 50% of all software development projects fail¹. The bulk of the failures are due to a lack of planning at the outset of a project and/or a lack of stakeholder alignment around objectives and expectations. To be successful, a significant and focused effort around planning, stakeholder engagement and alignment, system design, technology evaluation, and implementation is required.

To minimize the chances for failure, ASG (see Appendix B for a description of ASG) recommends the consortia use dedicated, experienced resources to help lead the efforts around the strategy/planning, design and implementation phases of the project.

This paper outlines:

- The context for the next generation Common Assessment Platform initiative
- Perspectives on the power of current / future technology to transform assessment
- Key technology trends that could influence the design of the Assessment Platform
- A three-phased “approach for success” in developing and deploying the new Assessment Platform

¹ Charette, Robert N *Why Software Fails*. IEEE Technology Spectrum, September 2005

- A management structure required for ensuring success. This structure consists of a) a core team of strategic and tactical technologists with deep experience gained from inside and outside the education industry, b) key individuals with the necessary skill sets being used at various points in the process, c) use of consultants for particular niches and focus areas associated with the platform development, and d) a Management Advisory Board consisting of top Education/Assessment, and/or Technology experts from world class technology companies to provide innovation and technology insight, as well as overall advice and guidance on the project.

DRAFT

Background

“I am calling on our nation’s Governors and state education chiefs to develop standards and assessments that don’t simply measure whether students can fill in a bubble on a test, but whether they possess 21st century skills like problem-solving and critical thinking, entrepreneurship and creativity.” -President Barack Obama, March 10, 2009

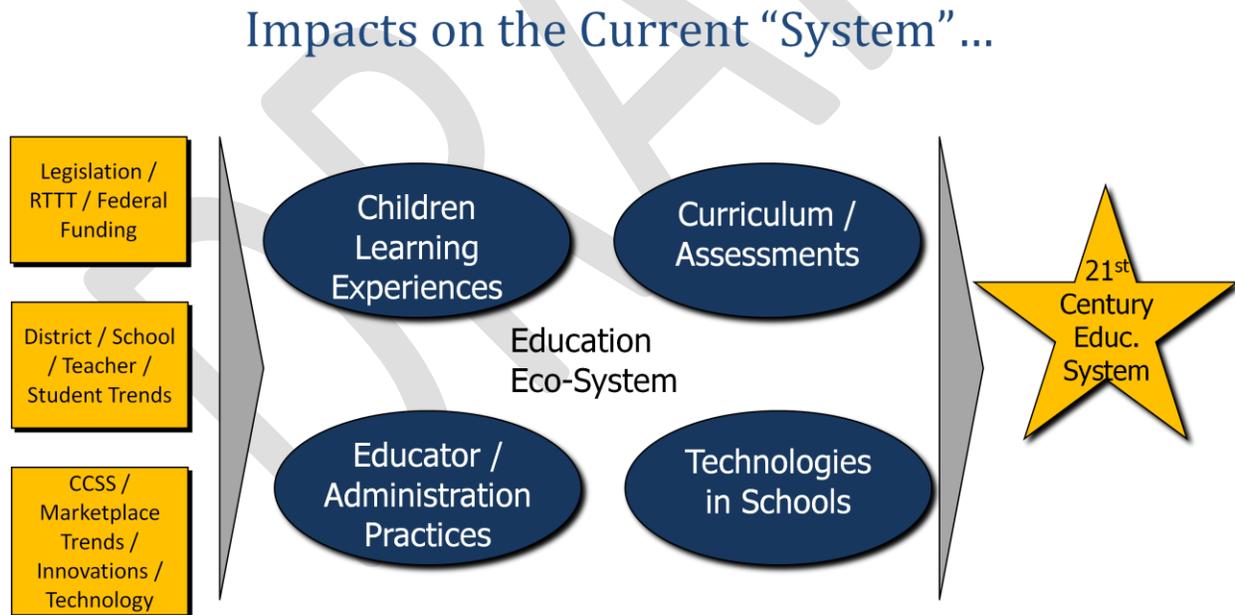
“Our education system at all levels will leverage the power of technology to measure what matters and use assessment data for continuous improvement.” - National Educational Technology Plan 2010 (Draft), U.S. Department of Education

“This new generation of state assessments will be an absolute game-changer in public education . . . For the first time, many teachers will have the assessments they have longed for.” – Arne Duncan

The quotes on the previous page have been seen by most in the educational assessment field. They reference the development of the Common Core State Standards (CCSS) and Race to the Top Assessment initiatives (RTTA) and serve to highlight that important changes are coming to education in general and educational assessment in particular. As of the writing of this paper, 43 states and the District of Columbia have signed on to the CCSS which will raise the bar for what students should learn and know in grades K-12. The RTTA will provide roughly \$350 million to two state assessment consortia, the Partnership for Assessment of College and Career Readiness (PARCC) and the SMARTER/Balanced Assessment Consortia (SBAC), to develop the next generation of assessments which are tied to the CCSS, as well as the new assessment platforms that will deliver the assessments online. This paper provides recommendations on how the consortia should go about the process of managing the build of the actual new assessment platform.

The CCSS and RTTA initiatives will have significant impacts on the current education eco-system as shown in Figure 1.

Figure 1 – Impacts on the Current Education Eco-System



The environmental factors shown on the left side of Figure 1 collectively provide educators, legislators and other constituents with a generational opportunity to improve the quality of education and assessment in the U.S. We must take full advantage of this opportunity.

The next generation assessments promise to be of much higher quality than oft-criticized current state assessments. Current assessments place a heavy emphasis on (low cost) multiple choice questions which require students to “bubble in” responses to factual questions rather than assessing their abilities to think critically and apply skills required to become “College and Career Ready” and succeed in the 21st Century. Aligning the new assessments with the CCSS and leveraging the power of the large number of students/states in the consortia will allow for the development of high quality assessments at a price roughly equal to or less than most states are paying for the assessments they use today.²

Both state assessment consortia plan on developing online systems to deliver the next generation assessments. PARCC will use a summative/through-course, linear assessment model while SBAC will use an adaptive model. Both consortia are using online systems in order to fully measure the content in the new CCSS, as well as provide the maximum potential cost savings to the consortia. The use of technology in education has lagged other industries and the assessment consortia have an opportunity to greatly improve the state of assessment in the United States and through this, instruction for students as well. However, because the technology in education environments has not kept pace with the rest of U.S. industries, the challenge in developing and implementing a new assessment platform will be a significant undertaking. It is crucial that this effort be managed carefully, particularly during its initial stages, in order for it to be successful.

Using Technology to Help Transform Education

The consortia will play a key role in driving a transformation in education as they develop the new assessments and assessment systems scheduled to be used by their member states in 2014/2015. The consortia will need to develop comprehensive, flexible next generation assessment platforms that are reliable and affordable for their member states. Additionally, the consortia will need to help transition their member states to the new processes and technologies envisioned from the new system.

Technology will be a central component of the assessment transformation allowing for transaction volumes on a national scale, secure storage of vast quantities of student/educational data, allowing flexibility to meet diverse state needs and providing many long sought capabilities including:

- *Providing linkage between curriculum, instruction, and assessment* – Technology will help enable assessment to be part of the *learning cycle* rather than an event that occurs only at the conclusion of learning or end of the school year.

² Topol, B, Olson, J, and Roeber, E. *The Cost of New High Quality Assessments: A Comprehensive Analysis of the Potential Costs for Future State Assessments*. Stanford Center for Opportunity Policy in Education, March 2010

- *Offering the flexibility to be delivered online* – The next generation assessment system should allow students to take assessments on multiple device types. Interoperability will be a key characteristic of the new system.
- *Being configurable for various assessment purposes* – The new assessment system should allow for different assessment types to be administered on the same platform. Summative, interim, end of course, through-course, adaptive and formative assessments should all be available on the platform. In a truly futuristic world, a teacher should be able to use the platform to choose assessment types, assessment purpose and design, select the assessment instruments or items to be used, administer the assessments, have them scored, receive reports of results designed for a variety of audiences and access previously developed curriculum and instructional models or develop a new curriculum-based assessment to administer all within a particular class period.
- *Using new item/content types* – The use of technology will allow for the use of new item types required to test certain standards in the CCSS. Technology exists to develop items that allow students to run simulations, interact with real-life scenarios, create graphics, and even play games. These items can be scored by the computer in real time and provide additional information to teachers regarding a student’s thought processes as he/she answered the questions. The use of items that require written responses, multiple choice, and performance events and tasks (written, photographed, and videoed) should be feasible on this system.
- *Allowing for content sharing/repurposing* – Technology will allow for multiple uses of content, sharing of content with others and enhancing existing content.
- *Scoring* – The new assessments will allow for real time scoring of many items and provide immediate feedback to students, teachers and parents. Artificial intelligence (AI) systems can be used to score many open ended item types efficiently and accurately and are expected to be used in the next generation assessments systems. Where AI is not now feasible, the system should permit student responses to be distributed to scorers anywhere (via a secure Internet-based scoring system) so that educators and/or content experts (paid or unpaid) can access them and score them.
- *Enabling enhanced reporting* – The new platform is expected to enable enhanced reporting and provide students, teachers, parents, administrators, and others involved in the learning process with information on students that can be used to *immediately* improve learning and performance.
- *Creating linkages to education communities of interest* – Students, parents and educators can communicate online with others that have an interest in a particular subject area, problem and/or solution. For example, students could submit technical papers to a particular committee or teacher(s) with an expertise in the particular

technical area and get feedback from someone with in-depth knowledge in the area of study.

The Platform Opportunity

Several, *proven*, technologies/technology approaches could play valuable roles in the development of the new platform for the two assessment consortia and thus, should be explored. These technologies offer opportunities to improve the cost, speed, and quality of development and increase the flexibility, scalability, and robustness of the assessment platform.

Open system/Open source approaches will allow the consortia to leverage “best of breed” technology solutions and vendors, as well as tie into the “clouds” of major software providers. Open source code allows the consortia to make use of already developed code in constructing the platform and typically results in a lower cost solution.

However, the use of open source code is not without its drawbacks. In particular, an open source solution requires a large development community with enough interest in the problem/application to develop and deliver robust applications. Additionally, all new code must be tested and certified for use by a central body that also manages the code base. Finally, the code must be tested to ensure it meets the high-level security requirements of a high stakes testing system. A true 100% open source code solution may not be practical for the consortia given the likely size of the developer base and security requirements inherent in an online assessment system.

We do believe there is a happy medium which will allow the consortia to leverage an open system environment and, potentially, some open source code. This solution will allow collaboration with a broad variety of industries and disciplines (e.g., crowd sourcing), as well as continual maturing and growth of the system over time.

Application Store/Software as a Service (SaaS) architecture provides the ability to flexibly add “best of breed” applications and vendors and/or change/remove applications from the overall solution. This structure also offers the benefit of continuous improvement of the different applications and vendors within the solution. Furthermore, there may be instances where some applications will be provided on a “pay to play” basis (i.e. test preparation, lesson plan review, etc). If this were to be the future case, the application store approach can provide a potential ongoing revenue source for the consortia.

Device Independence – The consortia should consider coding the application to maximize interoperability so that it can be downloaded and used on a number of different media such as mobile devices, tablet PCs, regular PCs, e-blackboards, etc., using a wide variety of operating

systems. Besides affording the user community more freedom in accessing the applications, such a strategy could help schools with poor student to PC ratios devise alternative means for completing assessment administration within the desired testing “window”.

Learning Management Systems and Large-scale Data Management applications for education have greatly improved in the last several years. Choosing among the best available technologies to manage large amounts of data, as well as determining the best method of tying into a larger education online platform will be important choices for the consortia.

If open systems and/or open source code will be used as the backbone of the application, the consortia will need to determine the **hosting model and code certification methodology** that best meets its needs. Different models to acquire these services should be investigated including, vendor hosting, university hosting and consortia owned hosting.

As described above, the opportunity to advance the current state of assessment and achieve closer linkage between assessment and curriculum is enabled by careful and strategic development of the new assessment platforms being conceived by the consortia. However, there will be several hurdles to overcome in moving member states to online assessment. Currently, few states have fully implemented online assessment, somewhat due to shortages of technology resources (people, PCs, bandwidth, money), fear of implementation problems, and the mixed success of states that have attempted to transition to online assessment. ***With the size and complexity of the change the consortia are contemplating, a disciplined and focused approach will be required to successfully develop an online assessment platform that all consortia member states can effectively use.***

The Planning Stage - Key Success Factors

Success on this complex effort can be achieved by leveraging proven development methods.

The long-term success of this initiative will depend on aligning and getting buy-in from key stakeholders early in the process. Involving key education leaders and practitioners with innovative ideas during the initial project stage will be critical. Moreover, the consortia should get clear buy-in and consensus from all stakeholders early on as the “business requirements” for the platform are developed. Proper development of the platform business requirements is a **critical** step in successfully building the platform and we will review this area in detail a little later.

The consortia should analyze past online assessment and other education technology implementation successes, as well as technology failures to learn the important lessons from

others' good practices and mistakes. Incorporating good methodologies and eliminating poor practices will increase the chances for a successful implementation. Past initiatives should be studied to gain a sense of the timeframes required, resources dedicated and other key factors important to a successful launch. Where possible, the consortia can look to leverage existing technology to help reduce costs and improve the chances of success.

With testing beginning in 2014/2015, there is not a lot of time to develop the new assessments and assessment systems. Consequently, the consortia should look to stage the implementation of the new system to help achieve success. Obviously, the assessment modules are the key system components that need to be ready when the initial system launches. Additional modules can be scheduled for launch in future years. A well thought out plan that considers the field test requirements, a full system trial in 2013/2014, and full scale launch in 2014/2015 is needed.

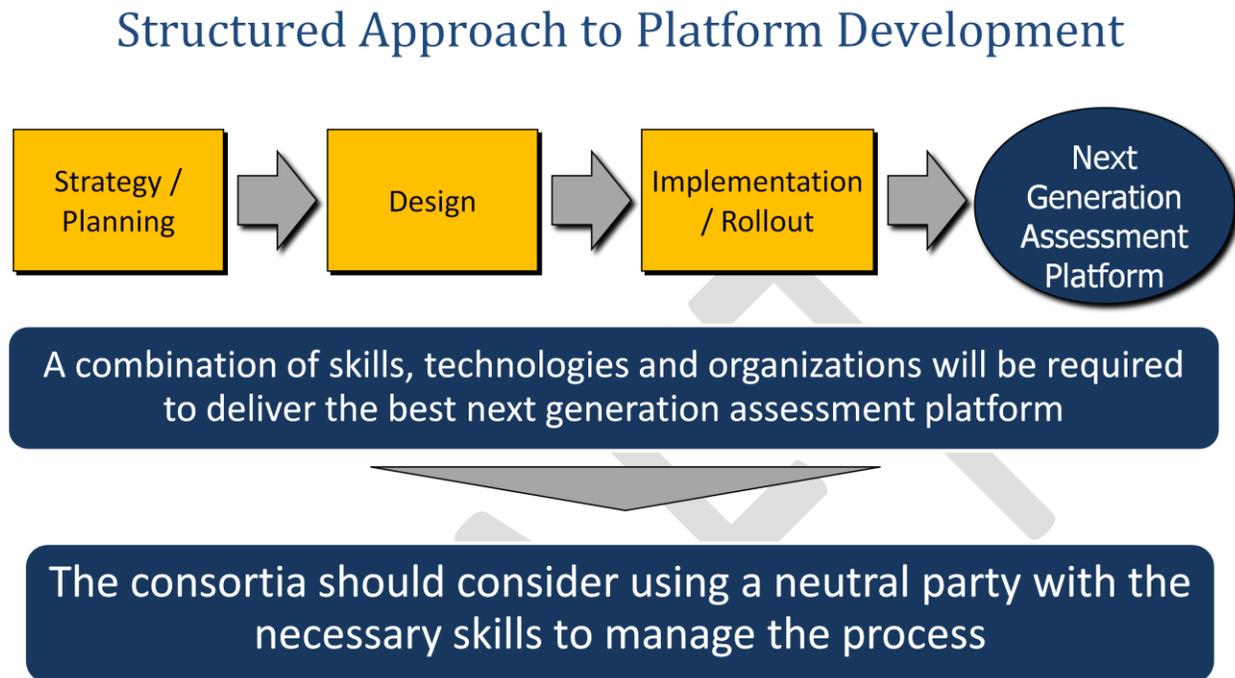
Additionally, the consortia will need to have a transparent, well understood and reliable implementation plan that includes cost estimates by development phase and year, resource requirements, training plans, state by state rollout dates, etc. The plan will also need to build flexibility into the system so it can grow over time and that future needs and new technologies can be accommodated.

It is critical that the consortia obtain and dedicate the right resources to help them through the initial strategy/planning phase of the development. An estimated 50% of all software projects fail and the bulk of those failures occur because of poor initial planning.³ **A primary message of this paper is that the consortia need to use the right expert resources and processes as they go about the strategy/planning phase of the platform development.**

Figure 2 below outlines a high-level, structured approach to building the next generation assessment platform. We will expand on each of the development phases, skills required to deliver the platform and our recommendation to use a 3rd party to manage the process later in the paper.

³ Charette, Robert N *Why Software Fails*. IEEE Technology Spectrum, September 2005

Figure 2 – Structured Approach to Assessment Platform Development



Process Management

The development of the next generation assessment platform will require a combination of skills, technologies and people/organizations to deliver a truly transformative application that will meet the needs of students, educators and parents for years to come. A combination of education, technology and business management skills will be needed. The educational expertise necessary in the early phases of the project should consist of:

- Assessment/measurement knowledge;
- Classroom and education administration expertise;
- Standards knowledge (CCSS, 21st century, etc.); and
- Knowledge of key trends in education curriculum and testing;

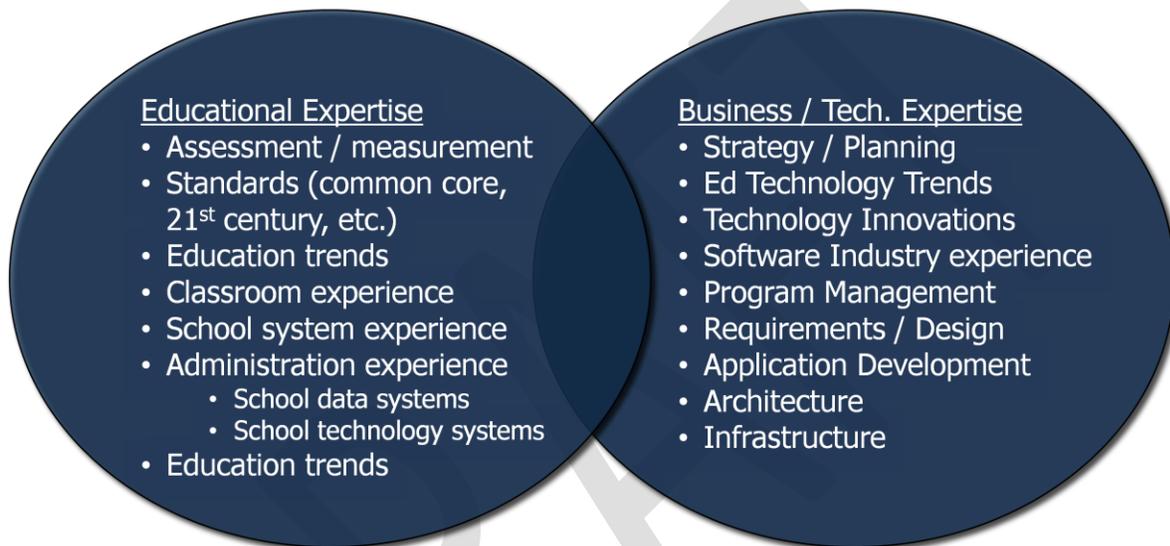
Additionally, individuals possessing the following technology and business management skills will be important parts of the team:

- Strategy/planning;
- Program management; and
- Requirements gathering/design experience.

In later stages, people with software industry experience, applications development background, systems architecture experience and infrastructure expertise will be added to the team.

Figure 3 shows the education and technology/business skills required on the team

Education & Technology Skillsets Required



Management Model

Due to resource limitations within the consortia, a limited history of developing and deploying transformative technologies on such a wide scale, and the breadth of skills required, our recommendation for the consortia is to use an independent partner to manage the platform development process. We believe that the risk of failure is too high if the needed skill sets are not obtained and the proper processes of developing business requirements are not followed at the outset of the project. Additionally, the effort to manage not only the strategy/planning phase but the design and implementation/rollout phases of the project will require a full-time, focused effort by a core group of people.

The right development/deployment partner for the consortia should have deep experience in:

- Educational assessment and measurement

- All aspects of technology
- Developing / deploying large-scale initiatives including a **proven methodology** for moving the consortia through the strategy/planning phase of the project in a reasonable period of time.

In addition, to ensure objectivity, the partner organization should not be tied to any particular hardware, software or vendor solution.

A solvable challenge faced by the management entity will be to have the right skills available at the right time. In order to deliver maximum value to the consortia at a reasonable price, Assessment Solutions Group recommends a dynamic staffing model. Such a staffing model will consist of a core team of individuals that will be involved throughout the project's life. The core team will have the key management and technology skill sets required for success and will provide project oversight and continuity over the course of the strategy/planning, design and implementation phases. Other individuals will rotate on and off the team based on the particular skills required for that phase. The core team will select and manage the individuals that rotate on and off the team. Lastly, consultants will be hired to fill short term skill gaps. These short term skill gaps might be directly related to a particular technology being used, vendor cloud or code selected or application being investigated.

We believe there are significant benefits to this approach and that it will enable the consortia to obtain the most qualified people and expertise available. Developing the next generation assessment platform is a high visibility project and people want to contribute to its success. Enabling key individuals to work on the project for specific durations of time will allow the consortia to get highly qualified expertise when needed. The approach will also minimize overhead, reduce costs and result in the best product. As shown in Figure 4, different skills will be required throughout the project's life. Dynamically staffing these skills will have significant benefit to the project.

Figure 4 – Skills required over time



Management Advisory Board

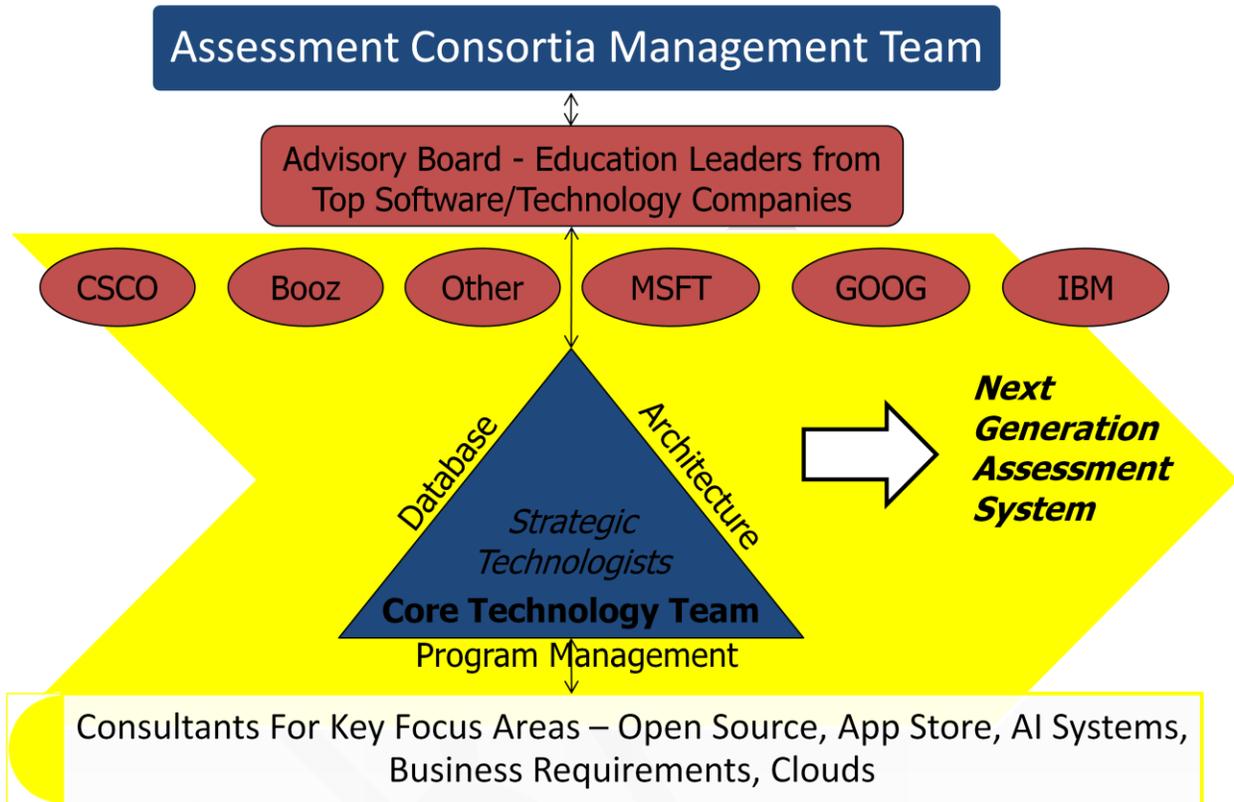
ASG also recommends establishing a Management Advisory Board of some of the best and brightest Education/Technology experts to help ensure the best solution is delivered. This advisory board will provide general technology and education technology innovation insight and subject matter expertise to the effort, as well as assistance in aligning key stakeholders. The advisory board will also help oversee the progress and direction of the overall initiative and provide support to the consortia leadership where needed. It is important to note that the consortia leadership has the ultimate management responsibility and authority for the project. The role of the advisory board is to assist consortia management in understanding different technology, development and management options.

ASG recommends that senior technology experts from world class technology companies comprise the Management Advisory Board. Cisco, Microsoft, IBM, Booz Allen, Google and other similar organizations are all examples of companies having individuals that, working together collaboratively, would add value to the board. Each of these companies has focused efforts in the education space and all see the greater value in improving the current educational system in the U.S. ASG has contacted select individuals from these firms and has secured commitments to join such an advisory board should one be formed.

Figure 5 shows the complete vision for the consortia platform management team.

Figure 5- Management Structure

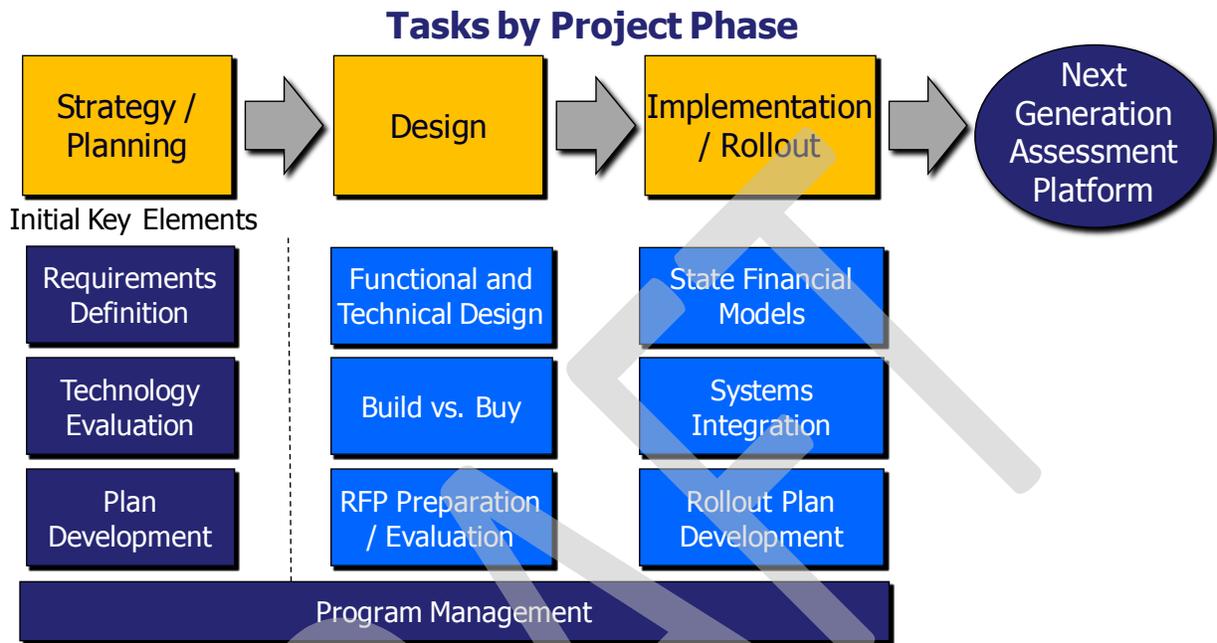
A Powerful Team



High-level Tasks by Project Phase

The consortia will need to ensure that several key tasks are accomplished during the strategy/planning, design and implementation/rollout phases of the project. Figure 6 shows the key high-level tasks in each project phase.

Figure 6 – Tasks by project phase



We have highlighted the initial key elements in the strategy/planning phase for immediate focus as the consortia must take special care to ensure these tasks are performed well in order for the project to be successful. As mentioned earlier, roughly 50% of all software projects fail and the majority of these failures can be traced back to problems/errors in the initial planning stage of the project (see Appendix A for a list of the most common reasons software projects fail). We will describe the tasks in the strategy planning phase in some detail over the next several pages. The tasks in the other phases of the project will be described, in less detail, in later sections of the document.

Strategy/Planning Phase

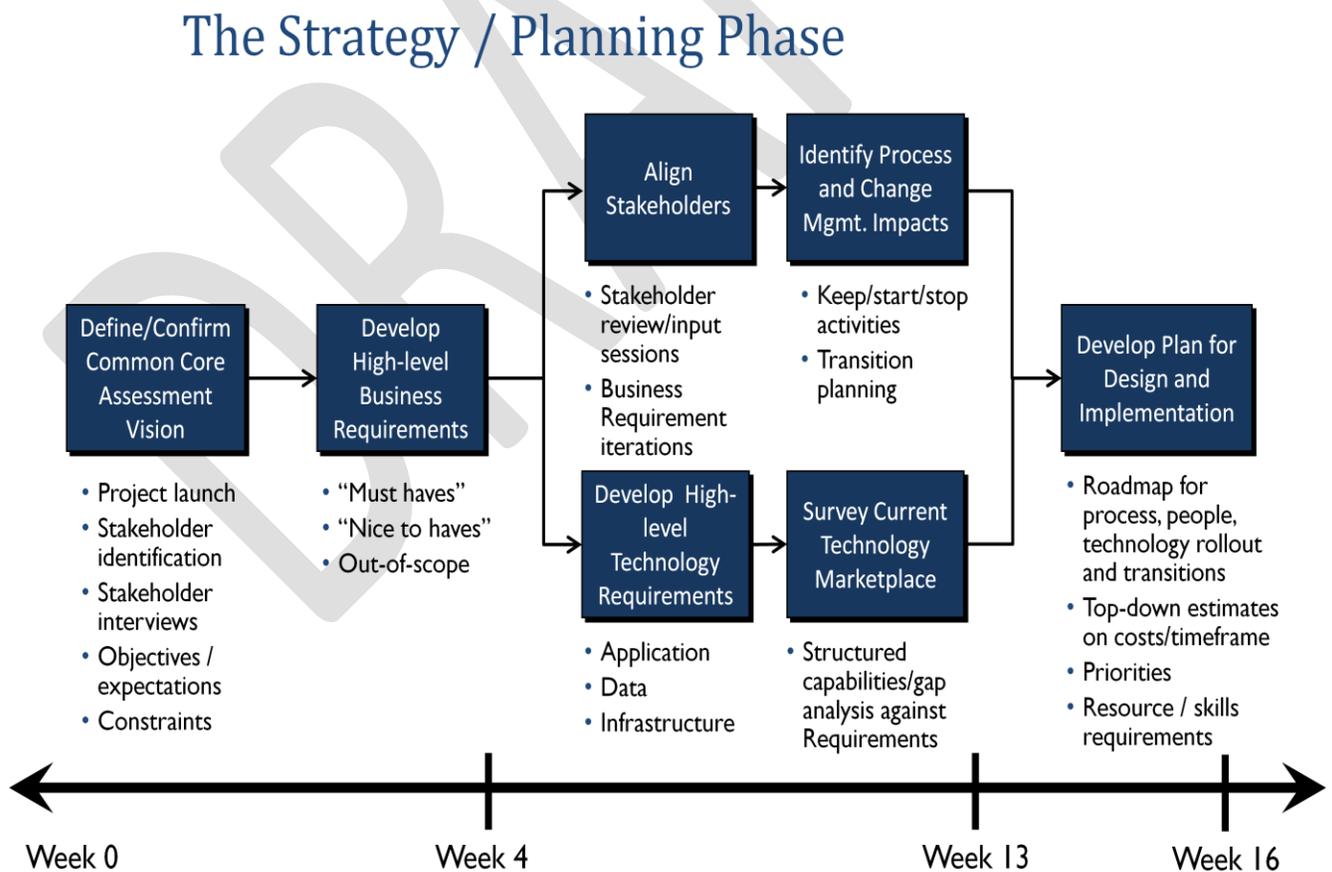
Figure 7 provides a more detailed look at the key elements in the strategy/planning phase. **End-state expectations should be determined up front to ensure that all key stakeholders are aligned on the objectives and high-level requirements. Weeks spent doing this at the start of the process will save years later in the project by avoiding the consortia and developers continually aiming at moving targets that result from unclear requirements and expectations. These steps will also prevent state partners from leaving the consortium due to misunderstandings over online assessment capabilities.** Even when the direction seems clear

at the beginning of the project, it is our experience that when “peeling back the onion”, stakeholders’ going-in assumptions and expectations vary widely which creates the moving targets. Also, there is a natural tendency to jump to answers (which technologies to use, what to build vs. buy, etc.) without having all the critical information at hand. Such behavior can often result in sub-optimal or even failed projects and must be avoided in the strategy/planning phase.

It is worth noting here that technology is not “the answer”, it is an enabler. The business requirements and change management implications are key items to get right at the outset of the project. The technology needs are simply by-products to create a system that meets the business requirements and stakeholder expectations. The business requirements should be clearly defined and *approved* prior to technology discussions even beginning.

Figure 7 shows the Strategy Planning Phase in detail.

Figure 7 – The Strategy/Planning Phase



Guiding the consortia through the strategy/planning phase will be a relatively intense effort that typically takes an experienced team of 4 – 5 individuals about 12 - 16 weeks to complete. First, the key stakeholders in the project are identified and in-depth interviews conducted. The objectives and expectations of each stakeholder are surfaced and recorded, commonalities and differences between stakeholders are identified and potential project constraints are noted. Adding challenge to this effort is the array of different types of stakeholders, ranging from governors, state superintendents (and their deputies), state assessment directors, curriculum directors, and a host of local educators.

The stakeholder meetings are highly structured interviews that capture the subjective information in a way that can be objectively analyzed. Interview guides are developed in advance of the stakeholder meetings to ensure the information is captured effectively and consistently and any ambiguities are clarified.

The stakeholder perspectives are then aggregated to create a future-state vision of the next generation assessment platform. This vision will be reviewed with the consortia and key stakeholders for endorsement and will form the unifying foundation for the remainder of the initiative. From the vision and the stakeholder interview data, high-level business requirements are derived. The business requirements are independent of technology and contain the required platform features and functionality. The feature and functionality requirements are categorized by priority (must have, nice to have, out of scope) and are used later in the process to help generate the development plan, cost and schedule. The requirements definition component of the strategy/planning phase is the key element in developing a successful platform development plan. Taking the time to do the work to ensure a good set of business and technology requirements at the beginning of the project **and** stakeholder buy-in of those requirements is a must.

The high-level business requirements are then turned into high-level technology requirements. The high-level technology requirements form the baseline for the infrastructure, data and application schema of the platform.

While the high-level technology requirements are just starting to be developed, the important process of getting stakeholder alignment on the high-level business requirements is taking place. Several review and input sessions are held with the stakeholders to present and gain agreement on the platform business requirements. Priorities are fleshed out, must have, nice to have and out of scope features and functionalities are discussed, agreed upon and ultimately, after a few iterations of the process, all the stakeholders are aligned on the final business requirements and platform priorities. Part of the alignment process includes establishing a change management policy including a methodology to inform the stakeholders of the impacts

(cost, schedule, risk) of requested changes to the project. Decision makers need to understand the impact of suggested modifications to the plan prior to their approval.

Part of the process of developing the high-level technology requirements is to survey the current technology marketplace to gain an understanding of the existing and emerging innovative technologies that could potentially be used to deliver the business requirements. This initial technology survey is also used to determine where there might be gaps in current technology required to deliver certain business requirements. The technology survey will also include a review of existing assessment platforms/vendors to gain an understanding of current capabilities, underlying technologies, and fit with the consortia business requirements. The current assessment system technology platforms and vendor reviews may provide a starting point for the consortia platform development and could save time and costs down the road. There are a host of assessment platforms in the marketplace, some by smaller technology based developers, worth looking at including ITS, CAL, Vantage/McAnn, RANDA, Nimble Tools, and AIR to name a few.

The output of the steps described in the previous paragraphs is a completed plan for the design and implementation of the assessment platform. The plan is a comprehensive roadmap for all facets of the platform development including a high-level description of the end-state system, processes and technologies to be used in delivering the system, resource requirements (cost and people) by project phase, project priorities, project schedule and rollout plan, project budget and key technology (i.e. build vs. buy, hosting) highlights.

Program Management

There are a variety of program services that will be required throughout the course of the initiative that are included in the description of the initial phase of the project. Key Program Management activities include ensuring:

- The project stays on course in terms of objectives, direction, time, and budget;
- Stakeholders are involved at the right points in the process and remain aligned through formal endorsement steps;
- The business and technical design is viable and represents a flexible, innovative solution that meets the Education system's needs for the near- and long-term;
- Oversight of the vendor(s) selected to develop the platform; and
- Future changes as a result of the new platform are managed thoughtfully and comprehensively taking into account impacts to all stakeholders and changes in the Education system's processes, technologies, and supporting skill sets.

Structured, monthly Program Management reviews should be set up with the consortia, the Management Advisory Board, the project's leadership, relevant vendors, and any other key decision-makers.

Design Phase Activities

Once the strategy/planning phase of the project has been completed, the design phase can begin. We have provided detail on three major tasks that need to be completed in this phase, functional and technical design and analysis, build vs. buy analysis and recommendations, and RFP preparation and response evaluation.

Functional and Technical Design and Analysis

The project team should develop a functional and technical design for the platform based on the business and technology requirements, survey of current technologies and assessment systems and guidance from the consortia leadership and Management Advisory Board. This deliverable will include:

- Detailed system requirements, features, and functionality
- An initial architecture of technologies to be used in delivering the business requirements (both now and in the future) and interoperability requirements
- Content / data model
- Different approaches to be used (i.e. open system/open source, software as a service, applications store)

The functional and technical design and analysis will form the basis for the technology systems request for proposal (RFP) the consortia will issue for the actual build of the system.

Build vs. Buy Analysis and Recommendations

Based on the work done in developing the business requirements, high-level technical design and review of existing assessment platforms, a thorough build vs. buy analysis can be completed. A good way to reduce risk in a development application is to buy something that currently exists and works. There is no sense in building when one can buy. While it is doubtful that a complete solution exists that will meet the needs of either consortium, certain components of an existing system may be able to be used/repurposed in the final system. Different options centered around build vs. buy alternatives will be examined and recommendations made to the consortia. Finally, the findings and agreed upon recommendations from this phase of the project will be reflected in the RFP for building the platform.

RFP Preparation and Vendor Response Evaluation

Based on the lessons learned from the previous evaluations and work conducted, an RFP to build the assessment platform will need to be prepared. The RFP will, most likely, be separated into different sections to allow different vendors, with different capabilities, to respond to particular components of the RFP/system. A detailed scoring rubric should be developed, in advance, that will be used to score the various responses from both a technical and cost standpoint. Recommendations on vendors to be selected for each applicable component of the system will be made after review and scoring of the RFP responses.

Implementation/Rollout Activities

We have identified three categories of services to be performed during the Implementation/Rollout phase of the project: 1) preparation of individual state financial models, 2) systems integration, 3) development of a roll-out plan and schedule for delivering the platform to member states including a *How to Implement Online Assessment* manual.

Preparation of Individual State Financial Models

The costs of converting to online assessment may be significant for many states. A comprehensive model should be developed for each state that includes state specific costs, benefits, breakeven points, return on investment, etc. in converting to online assessment. Such an analysis would consider one-time costs to purchase PCs, expand bandwidth, and build out a network, as well as ongoing costs of establishing a help desk function, software maintenance schedules, PC upgrade/refresh strategy and other related ongoing costs. Such an analysis would be useful to state departments of education and their constituents.

Systems Integration

Actual systems integration activities will be performed primarily by the vendor(s) contracted to build the assessment platform. The consortia will need to work with the vendor(s) to develop standards that will ensure a unified, maintainable system prior to beginning the development of the platform. These guidelines/requirements will include: technology standards, coding specifications, middleware to be used, interface requirements, and development approaches.

Additionally, the potential of using an applications store approach and the management issues surrounding that approach should be fleshed out during this time. Finally, this phase of the project will include identifying solutions for open source code management and administration as appropriate. As stated before, several issues including size of the developer base, code certification and code security requirements, hosting, and system management options will need to be investigated and appropriate solutions developed.

Rollout Plan Development

A comprehensive roll out plan (including a full system pilot) for delivering the new assessment system should be developed well before actual completion of the system itself. Resource requirements, costs, time frames, a training plan and documentation along with a state by state implementation plan should be produced to ensure the rollout proceeds as smoothly as possible. Additionally, a survey of the existing technology infrastructure in each state needs to be conducted so that individual state technology needs and issues are addressed and managed in order to ensure a successful implementation of the new system.

A key component of this plan should be an online implementation “How To” Manual. Many states that have moved to online assessment have experienced significant issues in the actual implementation of their new system. To our knowledge, a comprehensive manual on how to implement online assessment has not been developed. Such a manual would consist of a detailed, step by step approach to implementing online assessment and include network, bandwidth and help desk requirements/activities, lessons learned from previous state online assessment implementations, minimum PC/system requirements, minimum headcount requirements for implementation and ongoing support, network and bandwidth requirements. Additionally, the student to PC ratio for a given state could be examined and testing strategies developed to maximize use of PCs and minimize testing windows.

Conclusions

Developing the next generation assessment platform is a once-in-a-generation opportunity that should result in a *transformative* change in the way assessment is thought about and delivered in the U.S. Building such a system for the near- and long-term will be an extremely complex undertaking particularly with the quickly-evolving Education and Technology landscape. To be successful, a significant and focused effort around planning, requirements development, technology evaluation, platform design and implementation is needed. A sound plan and strategy to manage the three phases (strategy/planning, design, rollout/implementation) of the project is a must. In particular the development of the business and technical requirements, alignment of stakeholders and creation of the platform development plan are key tasks that should be completed at the outset of the project.

We believe the management structure outlined in this paper represents a sound approach for supporting the consortia in successfully delivering the next generation assessment platform. That structure consists of a core team of strategic and tactical technologists with deep experience gained from inside and outside the education industry, key individuals with needed

skill sets being used at various points in the process, use of consultants for particular niches and focus areas associated with the platform development and a Management Advisory Board consisting of representatives of world class technology companies to provide innovation and technology insight, as well as overall advice and guidance on the project.

Following the recommendations in this paper will greatly improve the odds of developing a successful, next generation assessment platform that will greatly improve assessment and education in the U.S. and be used by all consortia states for years to come.

DRAFT

Appendix A – Why Software Projects Fail

The following is a list of the most common factors in why software projects fail. The list was taken from an article written by Robert N. Charette that appeared in the September 2005 issue of the IEEE Technology Spectrum.

Among the most common factors:

- Unrealistic or unarticulated project goals
- Inaccurate estimates of needed resources
- Badly defined system requirements
- Poor reporting of the project's status
- Unmanaged risks
- Poor communication among customers, developers, and users
- Use of immature technology
- Inability to handle the project's complexity
- Sloppy development practices
- Poor project management
- Stakeholder politics
- Commercial pressures

Appendix B – About ASG

The Assessment Solutions Group (ASG) is a consulting organization that assists state departments of education with assessment costing, assessment program evaluation, procurement and management functions. ASG senior consultants and technical advisors have more than 100 years combined experience in the assessment industry and expertise in all areas of the assessment function, including test development, psychometrics, Technology, production and manufacturing, quality assurance, scoring operations, and logistics. ASG uses its proprietary costing model to help clients develop cost-effective and efficient assessment program designs, as well as to develop and evaluate proposals for implementing high-quality, affordable systems.

The ASG team consulted with and used its cost model to develop the assessment costs for the two state consortia that responded to the USED RTTT NIA for Comprehensive Assessment Systems. In this activity, dozens of assessment system design iterations were analyzed by ASG to assist the two state consortia to successfully design next generation, affordable assessment systems. As part of this work, ASG also performed technology research and estimated the cost requirements for each consortium to build its next generation assessment online platform.

Most recently, ASG has assembled a team of technologists experienced in all phases of project development to potentially assist the consortia in developing the next generation assessment platforms. The team consists of technology consultants, strategists, project managers, and architecture and design personnel from both the assessment and general technology industries. ASG has also assembled a Management Advisory Board of top Education and/or Technology experts that are interested in providing assistance to the consortia as the new assessment platform is developed.