
MEMORANDUM

Legislative Fiscal Office
900 Court St. NE, Room H-178
Salem, Oregon 97301
Phone 503-986-1828
FAX 503-373-7807

To: Representative Nathanson, Co-Chair
Joint Legislative Committee on Information Management and Technology

From: Robert L. Cummings, Principal Legislative Analyst (IT)
John F. Borden, Principal Legislative Budget Analyst

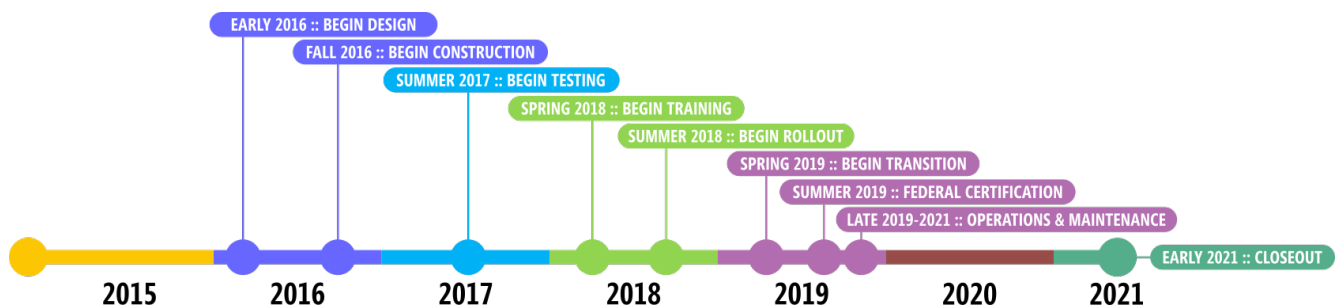
Date: April 28, 2021

Subject: Department of Justice (DOJ) Child Support Enforcement Automated System (CSEAS) Project - LFO Lessons Learned Report

A. Background

In the 2013-15 legislative session, the Department of Justice (DOJ) proposed a major multiple-biennium modernization project for its aging Child Support Enforcement Automated System (CSEAS). The Child Support Enforcement Automated System (CSEAS) Project received initial funding approval at that time for project planning activities. The timeline below shows a high-level milestone schedule for the project. The new system, now called Origin, was rolled out in two phases, beginning in December of 2018, and completed in April of 2019. Federal certification was gained in December 2019. Project closeout is scheduled for May 2021. DOJ will assume operational responsibilities in May 2021. Ten contractor staff will assist in maintenance and operations support through May 2022 to allow DOJ time to recruit qualified support staff.

CSEAS Project Historical Timeline



The purpose of this report is to provide a summary of the “lessons learned” that were identified by DOJ’s CSEAS Project team, the CSEAS quality assurance (QA) vendor, and Legislative Fiscal Office (LFO). The focus is not on what the CSEAS project team did wrong, particularly because the CSEAS Project was highly successful, but rather to identify those things that any major IT project (including modernization efforts) can do to significantly improve their chances of success.

B. Lessons Learned

As mentioned earlier, the DOJ project team and its quality assurance (QA) vendor completed robust “lessons learned” reports that identified dozens of detailed lessons learned regarding how the project was executed and managed, and how the new system was developed from components of similar systems from the State of California (core system functions code transfer), the State of Michigan (data warehouse and business intelligence design), and, the State of New Jersey (reporting process design). These detailed findings are provided in: 1) OR DOJ Child Support System Project Independent Quality Assurance Services 1.6 Lessons Learned Report - July 2, 2019; and 2) DOJ’s Closeout Report for the Oregon Child Support System Project - V1.2 - February 22, 2021.

OR DOJ Child Support System Project Independent Quality Assurance Services

1.6 Lessons Learned Report - July 2, 2019

The 1.6 Lessons Learned Report was developed by the quality assurance vendor for the CSEAS Project in July of 2019, and identified the following key lessons learned:

1. **Site Support Resources** - provide site support resources to assist office staff during implementation of the system;
2. **Co-location of Staff** - co-locate all project team members in a facility with an open floor plan;
3. **Standards and Checklists** - establish all quality standards and checklists prior to IM Contractor beginning;
4. **Training** - co-delivery of training by the Agency and IM Contractor training teams;
5. **Communications** - practice honest, transparent, and frequent communication to all stakeholders;
6. **Project Management** - develop and maintain strong project management disciplines;
7. **Team-Building** - conduct team-building activities and celebrate milestones;
8. **Data Cleansing** - start data clean-up and Organizational Change Management activities in the planning phase;
9. **Central Repository** - maintain a central repository for all project documentation that is accessible to all project team members;
10. **Phased Rollout** - implement the system using a phased rollout approach instead of a "big bang" rollout to all users;
11. **Phased Rollout Analysis** - conduct a thorough analysis of qualitative and quantitative data to determine the phased rollout approach and the specific pilot and subsequent rollout offices;
12. **Cutover Dry-Runs** - conduct cutover dry runs and make adjustments, as necessary, for each of the phased rollouts;
13. **Project Plan Reviews** - conduct periodic reviews and updates of project plans and documentation;
14. **Leadership** - ensure strong leadership that is active and available throughout the life of the project;
15. **Embedded Staff** - embed Agency staff in the project throughout the System Development Lifecycle (SDLC);

16. **Staffing** - select highly motivated and self-directed team members who have the appropriate skills to conduct the responsibilities associated with their project roles; and
17. **Federal Certification Materials** - discuss templates with the federal Office of Child Support Enforcement (OCSE) before beginning the development of federal certification materials.

Closeout Report for the Oregon Child Support System Project - V1.2 - February 22, 2021

The Closeout Report (prepared by DOJ) for the Oregon Child Support System Project also identified a significant number of challenges and lessons learned including:

1. **Phase-Based Lesson Learned Sessions** - early in the project, the project team established a disciplined approach to identify and track lessons learned by holding a lessons learned session following each project phase;
2. **Budget Contingency Reserve** - build contingency reserve into the project budget;
3. **Hosting Services Cost-Benefit Analysis** - complete cost-benefit analysis for hosting services in the planning phase;
4. **Data Cleanup** - start data cleanup and organizational change management activities in the planning phase;
5. **Transfer State System Experience** - plan for a group to spend time at the transferring state to study their system, including the case-based versus participant-based concept prior to starting the project. Did not incorporate a reciprocal visit to view the transfer state system;
6. **Help Desk and Command Center Resources** - needed more resources to fully staff the help desk and Command Center. Program participation in Joint Application Development (JAD) sessions waned in Operations and Maintenance. Needed to encourage program collaboration with the Project Team;
7. **Transfer Solution Documentation** - assure sufficient documentation to support the transfer solution code. Training updates did not match new functionality and workflow processes. Development and testing for change requests caused changes in the system not subsequently updated in documentation;
8. **System Shadowing** - Include shadowing the transferring state in our transfer solution. Review a Proof of Concept of the transfer system prior to starting the project, particularly the judicial piece of Oregon's Child Support Program;
9. **Co-location of staff** - Co-locate all (agency and contractor) project team members in a facility with an open floor plan;
10. **Project Management Discipline** - develop and maintain strong project management disciplines;
11. **Project Management Training** - provide project team training to ensure all project team members understand and follow the project management disciplines outlined in the Integrated Project Management Plan;
12. **Central Repository** - maintain a central repository for all project documentation that is accessible to all project team members;

13. **Leadership** - ensure strong leadership who are active and available throughout the life of the project;
14. **Embedded Agency Staff** - embed agency staff in the project throughout the system development lifecycle;
15. **Team Member Selection** - select highly motivated and self-directed team members who have the appropriate skills to conduct the responsibilities associated with their project role;
16. **Training** - co-deliver training with the agency and contractor training teams.
17. **Stakeholder Communications** - practice honest, transparent, and frequent communication to all stakeholders;
18. **Phased Rollout Approach** - implement the system using a phased rollout approach instead of a “big bang” rollout to all users at once;
19. **Data Driven Rollout Approach Selection** - conduct a thorough analysis of qualitative and quantitative data to determine the best phased rollout approach and the specific pilot and subsequent rollout offices;
20. **Cutover “Dry-Runs”** - conduct cutover “dry runs” and adjust as necessary for each of the phased rollouts;
21. **Continuous Review of Key Project Artifacts** - conduct periodic reviews and updates of project plans and documentation;
22. **Team-Building** - conduct team-building activities and celebrate milestones;
23. **Federal Certification Materials** - discuss templates with OCSE before beginning the development of federal certification materials;
24. **Project Funding Planning** - conduct early careful funding planning to assure funding availability throughout the project;
25. **Oversight Support** - get and maintain support from oversight agencies;
26. **Timely Review of Project Artifacts** - plan and assure sufficient time for reviewing and updating project artifacts;
27. **Test Case Development** - allow sufficient time for test case development;
28. **Testing Quality** - insufficient testing of system, batches, and interfaces before the new system was moved into production;
29. **Interface Interdependencies** - plan for potential project impacts due to dependency on receiving test files from system interface partners;
30. **Training Impacts** - assure training environment availability and stability to minimize related impacts to the delivery of training to staff;
31. **Aggressive Schedule** - minimize the potential impacts of an aggressive schedule on the project’s ability to deliver a quality product;

32. **Resource Requirements** - estimating large complex projects is very challenging. Estimating the number of Agency resources needed to support the project needs to be based upon a detailed task-driven project plan. Triangulating project resource estimates with similar-sized projects can help minimize these challenges and their impact on the project;
33. **Stakeholder Expectations** - managing stakeholder expectations and their acceptance of the new system was particularly challenging. Stakeholder involvement and training is essential to both managing their expectations and acceptance of the new system;
34. **Knowledge Transfer** - make sure that the project plan allows sufficient time for Technical Training and Knowledge Transfer (TTKT) between Agency staff and contractor staff;
35. **Requirements and Design Alignment** - though challenging, make sure that steps are taken for identifying and documenting an accurate design based on the needs and desires of the Program;
36. **Transfer System Deficiencies** - thoroughly review any required artifacts from the transfer state are both available and complete. The agency received incomplete source code artifacts from the transfer state, which led to increased scope and costs; and
37. **Third-Party Software Problems** - before committing to the usage of an external third-party product, verify that the product has been successfully installed and utilized in a comparable system environment. The Agency encountered numerous problems with one of the key software products (the Empower Editor), that was required for editing forms and documents.

LFO Identified Lessons Learned

In addition to the “lessons learned” identified by LFO as part of its seven-year (2015-2021) oversight responsibilities for the CSEAS Project, LFO examined the project artifacts listed below as part of its review process:

1. 1.6 - Lessons Learned Report - 07/02/19;
2. 2.1d.12.3 - QC Review Report Implementation Plan;
3. 2.3b.13 - June 2016 QA Monthly Status Report;
4. 2.3b.14 - July 2016 QA Monthly Status Report;
5. 2.3b.18 - November 2016 QA Monthly Status Report;
6. 2.3b.19 - December 2016 QA Monthly Status Report;
7. 2.3b.20 - January 2017 QA Monthly Status Report;
8. 2.3b.21 - February 2017 QA Monthly Status Report;
9. 2.3b.23 - April 2017 QA Monthly Status Report;
10. 2.3b.26 - July 2017 QA Monthly Status Report;
11. 2.3b.39 - August 2018 QA Monthly Status Report;
12. 2.3b.40 - September 2018 QA Monthly Status Report;
13. 2.3b.41 - October 2018 QA Monthly Status Report;
14. 2.3b.42 - November 2018 QA Monthly Status Report;
15. 2.3b.43 - December 2018 QA Monthly Status Report;
16. 2.3b.44 - January 2019 QA Monthly Status Report;

17. 2.3b.45 - February 2019 QA Monthly Status Report;
18. 2.3b.46 - March 2019 QA Monthly Status Report;
19. 2.3b.47 - April 2019 QA Monthly Status Report;
20. 2.3b.48 - May 2019 QA Monthly Status Report;
21. Child Support System Project Steering Committee Minutes - 04/16/18;
22. Child Support System Project Steering Committee Minutes - 05/16/18;
23. Child Support System Project Steering Committee Minutes - 09/17/18;
24. Child Support System Project Steering Committee Minutes - 11/19/18;
25. Child Support System Project Steering Committee Minutes - 12/17/18;
26. Child Support System Project Steering Committee Minutes - 01/28/19;
27. Child Support System Project Steering Committee Minutes - 04/15/19;
28. IVV Cycle 1 Report;
29. IVV Cycle 2 Report;
30. Project Closeout Report - 02/22/21; and
31. LFO Memo - Child Support Enforcement Automated System (CSEAS) - District Attorney Office Complaints - Lane and Clackamas Counties - 12/12/20.

In its comprehensive review of the artifacts identified above, LFO identified a number of key lessons learned that could potentially be applied to future projects, regardless of size, complexity, and type. In particular, these lessons learned would be particularly useful to major complex multi-year modernization type projects (a number of which are currently in progress across state government).

Before proceeding, it is important to note that DOJ, overall, has done an excellent job of managing and executing the CSEAS Project, and in general has been very consistent in its willingness to follow industry standard Project Management Body of Knowledge (PMBOK) project management practices, and also generally followed best practice SDLC practices and standards as well. That said, every project faces a wide-range of challenges during its lifetime, and the CSEAS Project was no exception. The success of the CSEAS Project was at least partially the result of the project's willingness to learn from the wealth of project management best practices that have been accumulated over the years in both the public and private sectors.

The CSEAS Project lessons learned that have been identified by LFO fall into three major types: a) doing the right things - the willingness of DOJ to do those activities/actions that over the years, have been shown to enhance a project's chances of success; b) not doing the wrong things - the willingness of DOJ to not do those activities/actions that are known to reduce a project's chances of success; and c) being flexible - the willingness of DOJ to adjust its activities/actions throughout the project when what they were doing simply wasn't working.

Though there is some overlap between LFO's list of lessons learned and those identified by DOJ and its QA oversight vendor, the focus of LFO's findings is, in most cases, at a slightly higher level than those identified by the agency and its oversight. LFO's review identified the following key lessons that can be of value to future information technology projects. More specifically, the list of lessons learned below is not a list of what DOJ didn't do, but rather what they did do, that led to their success. In addition, there are also a number of lessons learned that they will likely do on future projects, so they can be even more successful.

Lessons Learned #1 - Project Leadership and Organizational Support and Involvement - the importance of strong project leadership, organizational support, and involvement has historically been identified as a key success factor in major IT projects. The importance of selecting highly experienced and committed technical and customer project leadership cannot be over-emphasized. Leading major IT projects, and in particular, modernization efforts which are highly complex and demanding, requires the acquisition and retention of highly qualified and committed leadership. Without this leadership's continual involvement throughout the project, all the way through implementation, it is very likely that the project will fail. Major IT projects typically take several biennia to complete, and the day-to-day demands on leadership are considerable. It is essential that organizational leadership regularly show their support, involvement, and commitment to the project and its leadership. In addition, major IT projects have significant impacts on everyone within the organization, and agency leadership needs to plan for these impacts, and do everything possible to mitigate the negative impacts on their organizations. It is noteworthy to mention, that many private sector organizations refer to major IT projects as "death marches." Organizational staff (both technical and customer) can only handle so much stress over so much time, before it begins to adversely affect them, their work, and the health of the both the project and the organization itself. The demands that a major IT project puts on its staff, its business, and the well-being of the organization should not be underestimated.

Lessons Learned #2 - Importance of Maintaining Operational Service Levels - major IT projects often have unintended major impacts on an organization that go far past the project team itself. Modernization projects have even greater impacts, as the current operations of the organization typically receive a major overhaul that involves many, if not most, of the organization's staff. Operational service levels are often impacted due to the transfer of key operational staff to the project team, and particularly during the "big-bang" or phased implementation of the new system. It is critical that an organization develop a plan for maintaining operational service levels throughout the life of the project. There are many strategies that can be utilized to help mitigate potential operational impacts and to aid in the implementation of the new system and its updated business processes. One of the more common strategies is the hiring and training of additional staff to backfill transferred staff.

Lessons Learned #3 - Value of Foundational Strategic Plans Being in Place - major organizational modernization projects are typically more successful when the agency has completed a full suite of supporting strategic plans, in support of the modernization IT project (which may be only one of many IT projects in support of the overall organizational modernization goals). These strategic plans typically include: a) a business strategic plan; b) an enterprise architecture strategic plan; c) an IT strategic plan; and d) a modernization strategic plan.

Lessons Learned #4 - Value of Detailed As-Is and To-Be Business Process Models - major agency and technology modernization efforts need a solid blueprint of the current and to-be business and technology environments, to facilitate the planning and replacement of their current environments. Without these foundational artifacts to utilize as a guide for the design and development of the new business and technology environments, there are significant costs and risks inherent in moving forward with these types of projects (even if they proceed with replacing only one system at a time). The risks are even greater when the new system (including both business processes and technology) is being transferred in from another state, which likely will not be able to provide these models from their business and technology environments.

Lessons Learned #5 - Project Funding Planning - making sure that project funding is available throughout the project presents numerous challenges. Project schedules and budget cycles are not always in alignment, and delays in obtaining funding (i.e. delays for legislative approval of funding requests, delays in bond sales, stage gate review approvals, etc.) all can cause major impacts, or delays. Project funding planning (particularly for cross-biennial projects) should begin very early in the stage gate review process, and the project schedule and budget requirements need to be aligned with the legislative budget schedule (including bond sales), to help make sure that project funding is available for the project when it is needed. Failure to do so, can result in the project not having the funding it needs for contract award, or the beginning of the execution phase of the project, implementation, and production. In addition, planning for funding production, maintenance, and operations should begin well before the planned implementation date.

Lessons Learned #6 -Value of a Systems Integrator - it has become clear via the successful completion of a half-dozen recent major State of Oregon IT projects (many of which are modernization type projects), that acquiring a systems integrator to help direct/guide major modernization efforts is a prudent decision in order to acquire skilled project directors and managers, to reduce and mitigate project risks, and to ultimately significantly improve the chances of success of a project. Very successful projects with the Department of Revenue (DOR), Oregon Judicial Department (OJD), Oregon Department of Transportation (ODOT), Department of Human Services/Oregon Health Authority (DHS/OHA), and now DOJ's CSEAS Project, all share a common trait, they relied heavily upon the system integrator services of external vendors (many of which with significant experience with the application software that was to be developed and implemented).

Lessons Learned #7 - Enterprise Information Services (EIS)/LFO Stage Gate Review Process Usage - the discipline that the Joint EIS/LFO Stage Gate Review Process requires in both the project management and system development lifecycle of a project, are clearly evident in the CSEAS Project. Major IT projects should always use this highly defined disciplined process. There are few good reasons for not doing so.

Lessons Learned #8 - Organizational Project Management Maturity - a highly developed Project Management Office (PMO), project management leadership team, and project management infrastructure is critical to the successful management and execution of major highly complex IT projects. Project Management Institute (PMI) and Project Management Body of Knowledge (PMBOK) certified project managers, along with basic project management training for all members of the project team and critical members of the customer base, has been found to significantly enhance the management and success of major projects. Many organizations insist that all of their staff (technical and user) receive a reasonable level of project management training. Others use major IT projects as opportunities to have their less experienced project managers receive "real-world" mentoring by the senior lead project managers. It is never a good idea to have a junior project manager lead a major IT project. Airline pilots spend many years in the "right seat" learning under the watchful eye of the senior pilot before they earn approval to move to the "left seat" as the senior command pilot. The same disciplined learning approach should be utilized for project managers before they are allowed to lead major IT projects. If an agency doesn't have someone with the necessary skillsets, they should hire an external project manager (or even a project management firm, or a systems integrator) to acquire the needed skillsets.

Lessons Learned #9 - Readiness and Ability Assessment - at stage gate #3, it is critical that an assessment of the ability and readiness of the agency, its vendors, its project management artifact development, and any vendor products be conducted. LFO utilizes a detailed 170 question checklist that assesses project readiness and ability in eleven specific areas, including project management leadership experience, ability, and readiness, PMBOK readiness, stage gate #3 readiness, estimate validation, SDLC documentation identification, high-level security plan quality, funding readiness, industry lessons learned review, vendor products readiness, etc. The agency should also conduct this readiness and ability assessment to make sure that it is indeed ready to move into the most challenging, and expensive phase of the project. If an agency finds that it is not ready, it can pause the project while it corrects any deficiencies. Failure to make sure that a project is truly ready to move into the execution phase of a project, often results in very serious impacts, delays, and cost overruns. It is a step that should not be skipped.

Lessons Learned #10 - Importance of Robust Project Oversight - while often viewed as an unnecessary inconvenience, quality oversight is essential to the effective execution of major IT projects. The CSEAS project had six separate oversight layers: a) DOJ management oversight; b) DOJ CSEAS Project Executive Steering Committee oversight; c) federal IT project oversight; d) independent quality assurance oversight; e) Enterprise Information Services (EIS) oversight; and f) Legislative Fiscal Office oversight. Each of these levels of oversight helped provide CSEAS Project Management with critical feedback on project progress, risks, concerns, and mitigation strategies. These quality related services were essential to the success of the CSEAS Project.

Lessons Learned #11 - Quality Control Reviews - it is critical that projects insist on having all of their key project management and SDLC artifacts reviewed by the independent QA vendor for quality and adherence to industry best practices and standards.

Lessons Learned #12 - Communications - project communications between all project team members and stakeholders is essential to project success. Quality communications begins with a comprehensive Communications Plan which assures that the right information gets to the right people in a timely manner. Transparency is essential in developing trust, teamwork, effectiveness, and efficiency between all project team members, stakeholders, and oversight. A project website for the project, regularly updated by project management is a best practice that provides great benefits to effective project management and communications. Communications needs to be open and honest and two-way across all team members. It is critical that project managers provide and receive project related information in a timely manner across the full life of the project. Historically, it has been found that failure to do so, can, and will lead to many serious consequences.

Lessons Learned #13 - Fixed-Price Deliverable-Based Contracts - in general, major IT projects should not be awarded as "time and materials contracts." While it is difficult to estimate the total costs of a new major IT system, this is no excuse for taking a short-cut and utilizing a time and materials contract, just because the vendors are either not willing to bid a fixed-priced contract, or simply want to transfer the project funding risk to the state. There are a number of techniques that can be utilized to minimize risks for both the state and vendors, that can allow a fixed price deliverables-based contract to be used. Over the years, both organizations and major IT vendors, have identified actions that can be taken to reduce risk to both parties, and yet still ultimately use a fixed-price deliverables-based contract. One of these techniques is to fund the project on a time and materials basis up to the point where a really solid set of detailed requirements have been identified, or up

through the completion of the general design of the new system. Thereafter, the balance of the project can be bid as a fixed priced deliverables-based contract. This contracting option can maximize the benefits of both types of contracts (time and materials for early in the project when estimating is often very difficult, and fixed-price deliverables-based later in the project, when there are fewer unknowns and estimating is easier).

Lessons Learned #14 - Project Estimation - one of the biggest challenges and risks to any major IT project is coming up with solid estimates. This difficulty is recognized in the stage gate review process that specifies an accuracy level of +/- 100% at stage gate #1, +/- 50% at stage gate #2, and +/- 10% at stage gate #3. Even with this recognition of the difficulty in estimating the total costs of major IT projects, most state agencies still struggle with getting really solid estimates. A number of actions can be utilized to help in this process: a) significant training of state staff in IT estimating methodologies; b) triangulation (validation) of project estimates at stage gate #3; and c) regular reviews of project estimates throughout the life of the project. Estimating should not be done just once at the beginning of the project, but should instead be an ongoing process throughout the project.

Lessons Learned #15 - Challenges Related to Developing for a Decentralized Customer Base - new systems that are going to be used by a wide-variety of organizations throughout the state provide significant challenges for project managers. Often these new systems must meet the needs of various size organizations, each of which may have its own way of doing business. In addition, many of these distributed organizations may be quite happy with their existing legacy systems (both business and automated functions), and don't see the need for the new system. It is critical that early in a major project that a plan is put together to facilitate the acceptance of the new system by these organizations. Communications, transparency, and including these organizations in the planning, requirements definition, design, testing, user acceptance, rollout, training and implementation of the new system is critical. If these organizations feel that they are not being listened to and are not part of the decision-making, there will be great reluctance in supporting the rollout of the new system, and using it in production after implementation. The new CSEAS system received significant pushback after implementation in Clackamas and Lane Counties, two of the 22 counties that the Agency contracts with for child support services. At least some of this pushback resulted from the failure of the project team to do a better job of working with these organizations to facilitate their acceptance. There also was clear evidence that communications were not what they should have been. Both counties felt that they had not been listened to throughout much of the project, and also felt that they were not part of the major decision processes for the project. It is critical on all projects that user acceptance be facilitated through inclusion, effective communications, appropriate stakeholder involvement, and participation in critical decision-making on system design.

Lessons Learned #16 - Importance of Governance and Appropriate End-User Inclusion - the CSEAS Project had a well-defined governance structure in place throughout the life of the project. The Child Support System Project Executive Steering Committee included a wide-variety of stakeholders and senior leaders from DHS/OHA, OJD, and ODOT, all with significant experience overseeing major IT projects. From the beginning of the project, by mutual agreement, the 22 District Attorney Offices had two representatives on the steering committee, one for the Oregon District Attorney Association (ODAA) Child Support Liaison, and one for an elected district attorney. Early in the project, these two seats were reduced to one when the district attorneys forego the elected district attorney representative. It is not clear why the district attorneys chose to only have a single representative. However, it is clear that there is disagreement between DOJ and a number of the 22 district attorney

offices related to the district attorneys having sufficient representation and say in decision-making related to the new CSEAS system. This was clearly evidenced by major complaints at the end of the project by both Lane and Clackamas County District Attorney Offices on how the system operated. Regardless of who is right regarding representation and inclusion in major decision-making on the CSEAS Project, it is clear that without appropriate inclusion of key stakeholders, project communications will suffer, and it is likely that decisions will be made by the governance body that may have not benefited from sufficient input from those that ultimately will use the system.

Lessons Learned #17 - End User Inclusion in Requirements and Design Definition & Approval - in order to minimize problems with user acceptance due to missing system functions and/or usability issues, it is imperative that end users be continually involved with all processes related to identifying system requirements, system design, and related approvals. While iterative system development lifecycles can help minimize surprises at user acceptance, there are no guarantees that replacing the traditional “waterfall SDLC,” with an iterative one, will eliminate all surprises at system implementation. Failure to have end-users sufficiently involved in requirements definition, system design, and approval of the system, its supporting artifacts, and documentation, often can lead to disconnects between what is built and what the customers wanted. Ensuring that end-users are appropriately involved in all key decision-making related to requirements, and system design (both business and technical), is essential to user acceptance and project success.

Lessons Learned #18 - Value of Utilizing a Well-Defined System Development Lifecycle (SDLC) -it is critical that agencies clearly define an appropriate development lifecycle for utilization in transferring or developing any new IT system. It is also important that agency technical staff are well-trained in this lifecycle (particularly if it is an iterative lifecycle) and that there is a clear understanding as to whether the implementation will also be iterative, or “big-bang.” This SDLC should be considered in developing the project estimates and workplan, and should be identified clearly at least by stage gate #3 (sooner would be necessary if a vendor contract has been awarded that will require both the vendor and the agency to be very familiar with the chosen SDLC and its usage).

Lessons Learned #19 - Importance of Developing All Necessary Project Management and SDLC Artifacts - there is often a temptation to skip the development of key project artifacts when there are tight project deadlines and insufficient staffing. One of the key reasons that the CSEAS Project was so successful was that project leadership (and project oversight) both insisted that all key stage gate artifacts were completed, reviewed, and maintained throughout the project’s lifecycle. When the project business case is being updated just before project implementation, it is clear that the project understands the importance of key project artifacts, and that they must be updated as changes occur during the life of the project. This is also true for the SDLC artifacts that will be essential for system maintenance, operations and usage. At stage gate #3, when the project readiness and ability assessment is conducted, the project should not be allowed to go forward without all project management artifacts completed. In addition, all key artifacts required at the stage gate #4 review need to be identified. These artifacts include system, operational, and user documentation, the system security plan/manual, the maintenance and operational plan, and related artifacts for the “care and feeding” of the new CSEAS system. This decision precludes systems being put into production without the necessary documentation to maintain, operate, and use the new system.

Lessons Learned #20 - Ongoing Review and Maintenance of Key Project Management Artifacts -

many of the project management (and SDLC) artifacts require maintenance, updating, and review throughout the life of a project. These artifacts include documents such as the project charter, project management plan, project communication plan, project requirements statement/traceability matrix, project scope statement, project schedule, project budget, project resource plan, business case, risk logs, test plans, data conversion plans, etc. The CSEAS Project team clearly understood the importance of maintaining these key artifacts, and making sure that there were adequate staff resources to get this work completed in a timely manner. Again, this is one of the reasons why the CSEAS Project was highly successful, and why key stakeholders and oversight felt comfortable that the project was being well led and managed. These artifacts are key communication tools that are critical for proper project operation, management, and oversight.

Lessons Learned #21 - Usage of Other State “Transfer Systems” - while the usage of other state’s systems (or even COTS packages) provides many advantages to agencies wishing to replace or modernize components of their business and technology infrastructure, it is important to note that the business models and architecture of these other state models may not align completely (or at all) with how the agency currently does, or wants to do business. Often, there is limited documentation for the other state’s transfer infrastructure (or for an agency’s own infrastructure) that would aid in assessing the alignment. In the long run, changing the other state’s system to matchup with the agency’s business model, may not be inexpensive, easy, or desirable. It also may not be “marketable” to the agency’s system stakeholders. The CSEAS Project found that this was true for at least some of the state systems that they considered in utilizing for developing CSEAS, and they also found that there was a lack of solid system documentation for these systems. Agencies should thoroughly research any proposed transfer system to make sure that it makes good business, technical, and financial sense to utilize them.

Lessons Learned #22 - Importance of Appropriate Staffing Levels - major IT projects tend to underestimate the level of resources that will be needed to fully staff the project. Part of this is the result of having to do an initial project budget very early in the stage gate view reprocess (i.e. stage gate 1). Estimates at that point are expected to be +/- 100%, but legislators often still want to know the estimated full one-time costs of the project (not just the funding needed for planning through stage gate 3). It is not always possible to provide a highly accurate overall total cost for a major new IT system at stage gate #1, where initial funding is often requested. That said, it is critical that agencies develop a robust resourced project plan at stage gate #3 of the project. The project estimates should be validated, where possible by an independent estimator. Even at stage gate #3, many agencies still tend to underestimate their resource needs for a variety of reasons including: a) weak project plan; b) inexperience in estimating large IT projects; c) lack of estimates for comparable projects in other states; d) fear of asking for what they really need; and e) desire to take shortcuts by not asking for funding needed for the care and feeding of the project itself, etc. Validating project estimates through triangulation and comparison with similar projects is especially important on highly complex, costly IT projects. The stage gate process helps deal with the challenges of estimating major IT projects, but ultimately at stage gate #3, the project needs a budget estimate that is +/- 10% in accuracy. Appropriate staffing levels come from a solid workplan, a clear idea of the actual work to be done, and the willingness to ask for sufficient staffing levels to build the new system, and to develop, maintain, and use all key project management and SDLC artifacts needed for this process. While the CSEAS Project did a good job of staffing the project to ensure that all key work got done,

many projects significantly underestimate their true resource needs for major IT projects (particularly modernization projects). These funding needs must also contain any costs related to maintaining the operational effectiveness of the agency during the lifetime of the project.

Lessons Learned #23 - Management of Interruptible Resources - nearly all major IT projects, particularly modernization projects, have a major impact on an organization's resources, both business and technical. Technical staff and business subject matter experts are typically moved out of their daily operational responsibilities to full-time roles on the IT Project. Unfortunately, these key individuals cannot be easily backfilled, and periodically there are operational issues that require these individuals to be temporarily returned to their former operational areas to deal with serious issues affecting the day-to-day business operations. When this happens, even if it is just for a short-time, the baseline critical path of the project schedule often gets impacted. This is particularly harmful for the project because these key technical and business resources may be simultaneously performing work in many different areas of the project (i.e. design reviews, training, help desk services, key programming assignments, team leadership roles, etc.). The impact of losing these interruptible (versus dedicated) resources often becomes significantly harmful to the project's progress. Having a fully developed "interruptible resources management plan" in place early in the project, can significantly help mitigate these impacts. The CSEAS Project was very effective in managing its many interruptible resources, despite the high number, and the distributed location of the key staff.

Lessons Learned #24 - Lead Times for Data Center Services - major IT projects often have significant demands for the data center that the new system is going to be developed and run on. Data centers not only have to provide support for existing systems from 100's of agencies, but also have to simultaneously support IT project needs from the same agencies. For example, the State Data Center (Data Center Services), regularly may have to support dozens of the average 170 IT projects that concurrently are in progress each biennium. The CSEAS Project required hundreds of new servers to be provisioned for the development phase of the project, and simultaneously had to plan for the ultimate implementation of the new CSEAS system. Obviously, the sooner an agency can provide the data center (or external cloud providers) with its development and operational service needs, the more likely the data center service provider will be able to meet the project's needs in a timely manner. It is also important to note that the data center must budget for a project's needs, and the state is primarily on a biennial budget cycle. Timing is critical.

Lessons Learned #25 - Project Impacts on Other State Agencies - it is common for agencies to focus on the impact of a project on their organization, staff, and stakeholders. However, major IT projects often also impact other agencies, both functionally and financially. The scope of the new major IT project should include all work and costs related to the development and implementation of the new system. This includes other agencies that are impacted. Other agency impacts and costs need to be identified and taken into account when developing project plans, schedules, resource needs, and estimates. If external agencies must do work (i.e. interface development) critical to the operation of the new system, this work has to be defined, planned, scheduled and budgeted for. Identification and coordination of this work is critical early in the project, and the agency needs to plan for contingencies should the external agency be unwilling or unable to perform the requested work. Projects are regularly delayed because external agency required work doesn't get done on time. It is also important to include these costs related to these external agencies into the total cost of ownership (TCO) for the new system.