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Applying the Capability Maturity Model to Assurance of Learning

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ABSTRACT

Assurance of Learning (AoL) focuses on the continuous improvement of curriculum development, program review, and, in many cases, accreditation. AoL programs are important for assessing undergraduate, masters, and/or doctoral degree programs, as well as the impact on curriculum management. A recent mandate from the Association to Advance Collegiate Schools of Business (AACSB) is the need for mature AoL processes to be in place. This paper describes the Capability Maturity Model (CMM) and discusses how it can be applied to assess the maturity and capability of any educational institution's AoL initiative. An Aol-CMM model introduced and discussed in this paper can be used to assess an academic institution's AoL maturity and then act as a road map to develop and align key processes to plan and advance to a higher level of AoL maturity. A set of AoL key processes at an AACSB accredited business school provides a backdrop and discussion to understand better the application of this CMM framework. This should be of interest and value since the model can be used by schools and programs with varying levels of process maturity and capability. Even institutions not interested in accreditation may find the application of a maturity model useful for improving academic excellence. Regardless, each school or program can assess its current state and then develop an evolutionary plan to reach the next higher level of AoL process maturity.

Keywords: Assurance of leaning (AoL), capability maturity model (CMM), accreditation

INTRODUCTION

The Association to Advance Collegiate Schools of Business (AACSB) is an international accrediting organization that reviews business schools' ability to provide quality programs. Accreditation is voluntary and includes self-evaluations, peer-reviews, committee reviews, as well as evaluations of strategic plans, mission statements, faculty qualifications, and curriculum. AACSB was established in 1916 as an organization where business schools could network and address issues affecting business education. Accreditation standards were developed in 1919 and often revised to support continuous improvement in college or university-level education. Many schools seek or maintain accreditation as way of promoting rigor, quality, and relevance in business education. AACSB standards are used to evaluate an institution's mission, operations, faculty qualifications and contributions, and programs to assure various stakeholders of a quality education (Association to Advance Collegiate School of Business, 2013).

Accreditation has many benefits not only to institutions and students, but also as an opportunity to increase a country's wealth (Kiger, 2002). In addition, many students are interested in

investing in an education that is more tangible, marketable, and personally satisfying and are therefore more interested in the quality and potential payback from their educational commitments (Dealtry, 2003).

AACSB International has over 1,300 member institutions in over 70 countries; however, only 650 member institutions hold AACSB accreditation (membership does not include accreditation). This represents approximately 6 percent of all undergraduate programs and only 4 percent of all master's and doctoral programs. AACSB also maintains a comprehensive database on current business school enrollments, programs, faculty, operations, students, and financial information that it makes available to its members. This information can be useful for schools and institutions interested in benchmarking their programs (AACSB, 2013).

Assurance of Learning (AoL) is an approach for the continuous improvement of curriculum development, program review, and, in many cases, accreditation. AoL programs are important for assessing undergraduate, masters, and/or doctoral degree programs, their maturity, and impact on curriculum management. A recent mandate from AACSB is that accredited and accredit-seeking institutions must have mature AoL processes in place. Therefore, this paper describes the Capability Maturity Model (CMM) and its application to assess the maturity and capability of AoL processes.

In 1986, the Software Engineering Institute (SEI), a federally funded research development center at Carnegie Mellon University, developed a Capability Maturity Model (CMM) to assess and evaluate the capability and maturity of software development processes. This model was chosen because it provides an evolutionary path that focuses on five levels of process maturity: Level 1—Initial, Level 2—Repeatable, Level 3—Defined, Level 4—Managed, and Level 5—Optimizing. Each level requires a number of defined steps to provide a path for incremental and continued process improvement. In addition, this model allows an organization to assess its current level of software process maturity and then help it to prioritize the improvement efforts to reach the next higher level. Although the CMM was developed with software development processes in mind, subsequent models have been proposed so not to be limited to a specific discipline. Subsequently, the CMM provided a basis for the Capability Maturity Model Initiative (CMMI) in 1991 that combines several models into a single framework to improve all types of processes across different organizations (Bush & Dunaway, 2005).

The objective of this paper is to provide a more thorough discussion of the CMM and describe how it can be applied to AoL projects in order to assess, plan, and improve a business school's AoL capability, performance, and maturity. An AACSB accredited business school's AoL initiative at a large mid-western university will provide a backdrop for understanding how the CMM can be applied. This should be of interest and value to many institutions interested in AACSB accreditation since the model can be used by programs with varying levels of process maturity and capability. Even institutions not interested in accreditation may find the application of a maturity model useful for improving academic excellence. Regardless, each institution can assess its current level and then develop a plan to reach the next higher level of AoL process maturity.

RELATED RESEARCH

This section focuses on describing several research areas that are relevant to developing and understanding the application of a process maturity model for AoL assessment. The purpose is to provide a better understanding of the evolution of AoL as a research topic and how this paper adds to a growing body of knowledge. The first area focuses on describing AoL experiences. For example, Hollister and Kopple (2007) describe an AACSB accredited business school's experiences of how "closing the loop," i.e., using the results from the retention assessment exam to change course content and pedagogy—can be an enormous undertaking. Other researchers, such Reynoso and Audrade (2009), also describe their experiences in redesigning an information systems (IS) program for accreditation in Mexico by analyzing related programs in other countries.

Other studies include surveys to portray the current state of AoL practices. In particular, Martell (2007) describes how AACSB standards have changed dramatically from 1991. In particular, AoL requirements switched from indirect measures (e.g., surveys) to direct measures (i.e., demonstration of student achievement) and has left many faculty and administrators bewildered. Martell compares two surveys—one conducted in 2004 and another conducted in 2006. In 2004, the greatest concern of the 179 deans surveyed was faculty knowledge of assessment (62 percent were worried or very worried), while the greatest concern in 2006 was the time required for assessment (68 percent were worried or very worried). On average, the 2006 respondents reported spending about $20,000 on AoL, which was about five times more than reported in the 2004 survey. Martell further suggests a greater involvement in AoL is taking place whereby schools are spending more time and money for external and on-campus training, instruments, staff support, and faculty stipends and incentives. It appears that the time, money, and resources for AoL assessment is increasing as schools and institutions struggle with AoL processes and new standards for accreditation.

In addition, Pringle & Mitri (2007) provide results of a survey of current practices at 138 AACSB-accredited schools. The study suggests that many schools have not developed strong assessment programs to meet new AACSB standards and continue to use indirect measures for assessment. Moreover, 43 percent of the respondents reported either some or significant faculty resistance to assessment. Another area of confirmation from this study is the increasing amount of time that assessment takes. Often assessment is inconsistent where many schools employ a trial-and-error approach.

Not surprisingly, this has led to the development of frameworks for improving students' education and assessment. For example, Manson, Curl, and Torner (2009) present a research framework for assessing the effectiveness of information assurance education by determining existing standards as a basis for improvement.

Alternatively, Harper and Harder (2009) present a framework for assessing MIS program effectiveness grounded on a student's progression through learning stages based on four competencies: technical, analytical, communicative, and managerial. Their work is based upon what is formally known about student outcomes assessment and input from their own stakeholders and accrediting bodies.

As the number of frameworks proposed has increased, Gardiner, Corbitt, and Adams (2010) provide a review of various assessment models and propose a six-step AoL model based upon the literature and their experiences. The model focuses on developing program goals, planning assessment activities, execution, and analysis in order to identify improvements and execute the approved improvements so as to close the AoL loop.

Another related research area focuses on process maturity. Process maturity has received a great deal of attention and interest in many organizations and by researchers. Recently, there has been an exploration to link process maturity and process performance (Ravesteyn, Zoet, Spekschoor, & Loggen, 2012), as well as processes and organizational agility (Verbaan & Silvius, 2012). It is argued that the improvement of process performance and maturity is critical for business success, and strategic alignment (Ravesteyn et al., 2012; Silvius & de Waal, 2010).

Subsequently, it is logical that the use of maturity models to evaluate process and maturity and guide process improvement has been applied to specific assessment activities. For example, Marshall & Mitchell (2002) propose an e-learning maturity model (eMM) based on the concepts of CMM, while Marshall (2009) describes a pilot application of this model to two large Australian universities. The eMM provides a benchmarking and quality improvement framework for informing and guiding the systematic improvement of e-learning institutions

More recently, Abu-Khadra, Chan, and Pavelka (2012), describe the Control Objectives for Information and related Technology (COBIT) framework that includes a maturity model to benchmark IS security and control practices. The study reports accounting information systems faculty's perceptions of the COBIT maturity model's components and contends that there is a disparity in its perceived value. The authors suggest a reexamination of the accounting curriculum to incorporate a significant governance discipline.

The main conjecture of this paper, therefore, is that a maturity model can and should be extended to larger scale for administering an inclusive AoL program.

THE CAPABILITY MATURITY MODEL (CMM)

In 1986, the Software Engineering Institute (SEI), a federally funded research development center at Carnegie Mellon University, set out to help organizations improve their software development processes. With the help of the Mitre Corporation and Watts Humphrey, a framework was developed to assess and evaluate the capability of software processes and their maturity. This work evolved into the Capability Maturity Model (CMM) (Humphrey, 1988). The CMMI for Software version 1.0 was published in 1991 and provided an evolutionary path for organizations to improve their underlying software processes. Two years later, the CMMI was revised as version 1.1 with another revision in 1997 as version 2.0. This planned version was never released, but it did serve as a basis for the Capability Maturity Model Integration (CMMI) initiative (Chrissis, Konrad, & Shrum, 2003).

Since the original CMMI initiative in 1991, organizations have used a number of CMMs for different disciplines or areas. Although helpful, using several different models can be

problematic because a particular model may limit process improvements to a specific area or discipline within the organization. Often these process improvements are not limited to a specific area but cut across different disciplines. As a result, the CMMI project was initiated to sort out the problem of using a number of CMMs (Chrissis et al., 2003). Currently, CMMI combined three models: The capability maturity model for software (SW-CMM), the system engineering capability model (SECM), and the integrated product development capability maturity model (IPD-CMM). The intent of CMMI was to combine these models into a single framework that could be used to improve processes across the organization and so that other disciplines could be integrated in the future.

The CMMI provides a set of recommended practices that define key process areas specific to software development. The objective of the CMMI is to offer guidance on how an organization can best control its processes for developing and maintaining software. In addition, the CMMI provides a path for helping organizations evolve their current software processes toward software engineering and management excellence (Paulk, Curtis, Chrissis, & Weber, 1993).

To understand the CMMI better, several concepts must first be defined:

- Software process—a set of activities, methods, or practices and transformations used to develop and maintain software and the deliverables associated with software projects. Included are such things as project plans, design documents, code, test cases, user manuals, and so forth.
- Software process capability—the expected results that can be achieved by following a particular software process. More specifically, the capability of an organization's software processes provides a way of predicting the outcomes that can be expected if the same software processes are used from one software project to the next.
- Software process performance—the actual results that are achieved by following a particular software process. Therefore, the actual results achieved through software process performance can be compared to the expected results achieved through software process capability.
- Software process maturity—the extent to which a particular software process is explicitly and consistently defined, managed, measured, controlled, and effectively used throughout the organization.

CHANGING THE MINDSET: FROM SOFTWARE PROJECTS TO AoL PROJECTS

In order to make the transition from software processes to AoL process, one has to change the mindset from software projects (building systems) to AoL projects (program assessment). Figure 1 provides a comparison between software projects and AoL projects.

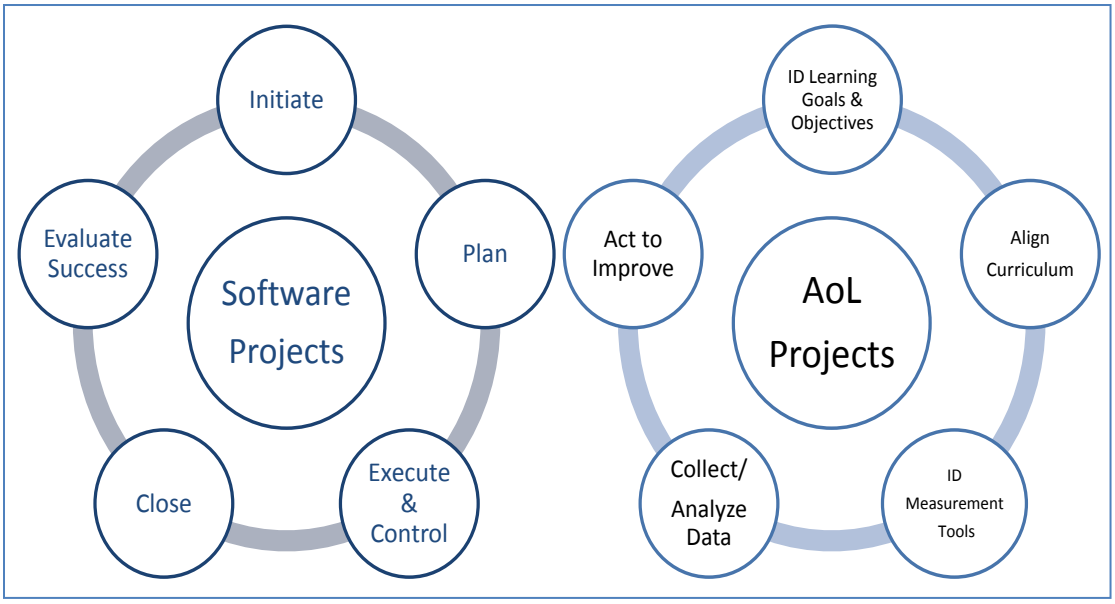


Figure 1: Comparing Software and AoL Projects.

The Project Management Body of Knowledge (PMBOK) outlines a set of processes that most projects follow. These processes include initiating the project, planning the project, executing and controlling the project, as well as closing the project and evaluating its success (Project Management Institute, 2008). Together, these processes make up and support a project life cycle and project methodology.

On the other hand, AoL projects tend to follow a total quality management or continuous improvement loop that includes identifying learning goals and objectives, aligning those goals and objectives with an existing curriculum, identifying measurement tools such as set of direct measures, collecting and analyzing data, and, finally, closing the loop by actively making improvements to improve student learning. Moreover, while software projects can produce a product or service that requires a substantial investment of time and money, AoL projects need to be cost efficient and often be completed within a year (e.g., one or two semesters). Aol projects also tend to be repeated each semester or every few years, while software projects are unique and are undertaken to replace legacy systems once they exceed a useful life. Regardless, the experiences and lessons learned from each of these types of projects can be applied to increase the efficiency and effectiveness of future project success.

AoL PROCESS MATURITY

Immature versus Mature Organizations

One of the keys to the CMM is the idea of process maturity to describe the difference between immature and mature organizations. In an immature organization, processes are improvised or developed ad hoc. For example, a software project team may be faced with the task of defining user requirements. When it comes time to complete this task, the various members of the team

may have different ideas concerning how to accomplish it. Several of the members may approach the task differently and, subsequently, achieve different results. Even if a well-defined process that specifies the steps, tools, resources, and deliverables required is in place, the team may not follow the specified process closely or at all (Paulk et al., 1993).

The immature organization is characterized as being reactive; the team members spend a great deal of their time responding to crises or find themselves in a perpetual state of firefighting. Schedules and budgets are usually exceeded. As a result, the quality and functionality of the project deliverables are often compromised. Project success is determined largely by who is (or who is not) part of the project team. In addition, immature organizations generally do not have a way of judging or predicting quality. Since these organizations operate in a perpetual crisis mode, there never seems to be enough time to address problem issues or improve the current processes (Ahern et al., 2005).

Similarly, in an immature AoL organization, the faculty or instructors assigned to complete an assessment or work on an AoL team may not have a clear idea of the task at hand. For example, learning goals may not be clearly defined or mapped to the course curriculum. In addition, there may be a reliance on the use of indirect measures or there may be a lack of understanding concerning in choosing appropriate direct measures. Courses with similar learning goals may be evaluated using different measures and consequently would have different outcomes. Analysis of the data collected may not be complete or credible, and opportunities to act to improve curriculum by "closing the loop" may be dulled. Often the culture of the institution may not support AoL initiatives and may be viewed by members of the faculty with suspicion or as a non-value added activity.

Mature organizations, on the other hand, provide a stark contrast to the immature organization. More specifically, processes and the roles of individuals are defined explicitly and communicated to everyone. The processes are consistent throughout the organization and improved continually based on experimentation or experiences. The quality of each process is monitored so that the products and processes are predictable across different projects. Budgets and schedules are based on past projects so they are more realistic and the project goals and objectives are more likely to be achieved. Mature organizations are proactive and they are able to follow a set of disciplined processes throughout the software project (Paulk et al., 1993).

A mature AoL organization will have a clear view of the entire AoL process, and this process is communicated to all stakeholders. Clear goals and a clearly defined set of direct measures are used consistently to assess learning goals that are mapped directly to the curriculum, while outcomes allow for decisions to improve curriculum and student learning. The culture of the mature AoL organization is one that is supported by a majority of the stakeholders who understand and appreciate its value.

The Road to AoL Process Improvement

The CMMI defines five levels of process maturity, each requiring many small steps as a path of incremental and continuous process improvement (Caputo, 1998). These stages are based on many of the quality concepts and philosophies of Shewhart, Deming, Juran, and Crosby (Paulk et

al., 1993). Figure 2 illustrates the CMMI framework for AoL process maturity. Each level allows an educational institution or program to assess its current level of Aol process maturity and then help it prioritize the improvement efforts it needs to reach the next higher level.

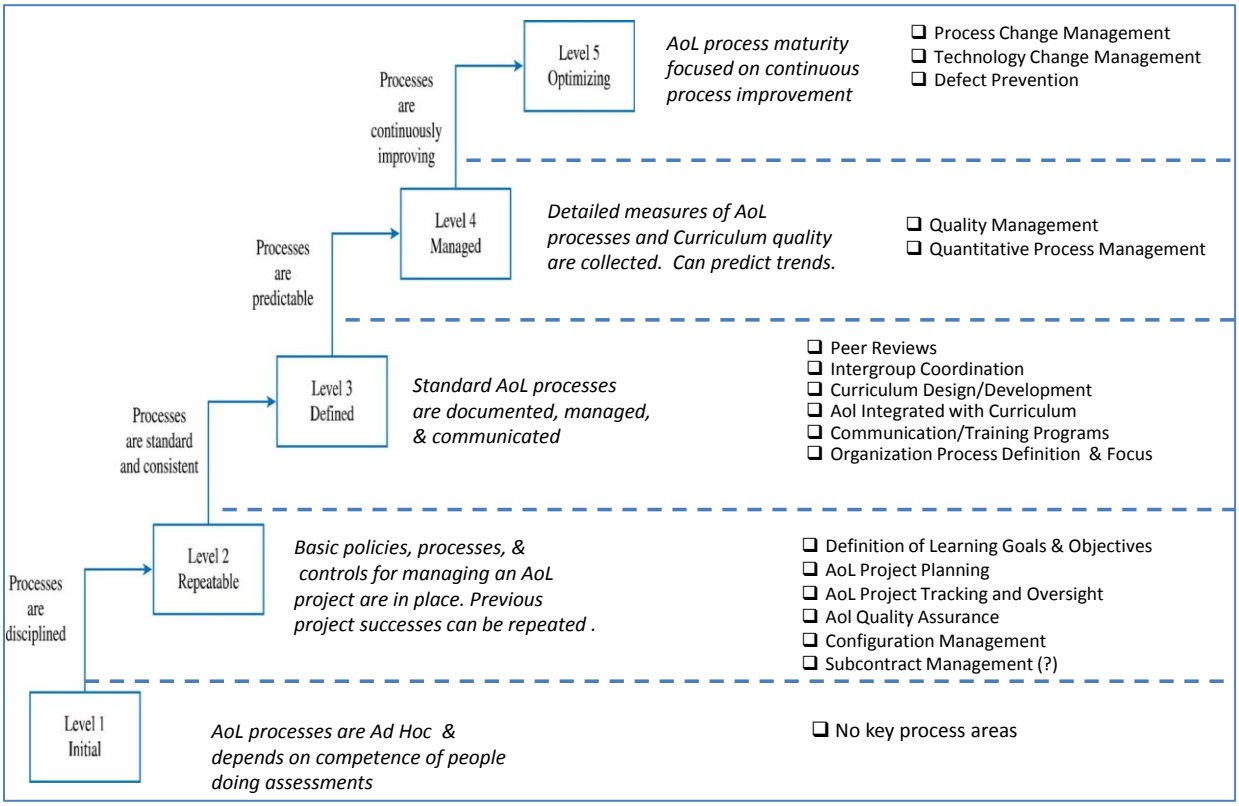


Figure 2: A Capability Maturity Model for AoL.

Maturity levels provide a well-defined evolutionary path for achieving a mature AoL process organization. With the exception of Level 1, each maturity level encompasses several key process areas that a school, department, or academic program must have in place in order to achieve a particular level of maturity. There are five levels to AoL process maturity.

Level 1: Initial

The initial level provides a starting point. This level is characterized by an immature AoL organization in which the AoL process is ad hoc and often reactive to administrative edicts. Few, if any, processes for planning, scheduling, and conducting an AoL project are defined. The Level 1 AoL organization does not have a stable environment for AoL initiatives, and success of an AoL project rests largely with the faculty or individuals conducting the assessment and not the processes that they follow. As a result, success is difficult to repeat across different AoL projects and throughout various programs (Ahern, Clouse, & Turner, 2003).

Key Process Areas.

- No key process areas are in place.

Level 2: Repeatable

At this level, basic policies, processes, and controls for managing the AoL project are in place. AoL project schedules or timetables and budgets are more realistic because planning and managing AoL projects are based upon past experiences with similar AoL assessment projects. Although assessment processes between AoL projects may be different at this level, the process capability of Level 2 AoL projects is more disciplined because assessment processes and direct measures are documented, enforced, and improving. As a result, many previous AoL project successes can be repeated by other faculty or individuals assigned to other assessments.

Key Process Areas.

- Definition of learning goals and objectives—ensures that a program's learning goals are clearly defined and agreed upon by the faculty.
- Aol project planning—establishes realistic plans or timetables for assessment activities and conducting an assessment.
- Aol project tracking and oversight—ensures that adequate controls are in place to oversee and manage each AoL project so that effective decisions can be made and actions taken when the project's actual performance deviates from the schedule or plan.
- AoL quality assurance—provides all AoL project stakeholders with an understanding of the processes and standards used to support an AoL project to ensure the quality of the assessment being conducted.
- Assessment configuration management—supports the controlling and managing of changes to the various project deliverables and assessment products throughout planned AoL project.
- Aol subcontract management—where appropriate, supports the selection and management of qualified subcontractors or consultants that are sometimes used by institutions especially early in their assessment maturity.

To provide context and an example, a description of the AoL process maturity at a particular Midwestern university can illustrate how the requirements for Level 2 are met. The College of Business at this university has clearly defined learning goals and objectives that are agreed upon and mapped to the curriculum. Figure 3 provides an example of how specific learning goals are mapped to each course using Bloom's Taxonomy.

In addition, a position in the dean's office was created to oversee and serve as a liaison to the university and each of the five academic departments to coordinate and assist with the scheduling and planning of AoL project assessments at the program, department and college levels. In addition, a college-level AoL team (i.e., the A-Team) has been formed, meets bi-weekly, and is comprised of several administrators and faculty representatives from each of the five academic departments. The A-Team provides a governance structure and makes recommendations directly to the college and department curriculum committees. In addition, a repository for storing, sharing, and managing all documentation is maintained in a software product called Microsoft Sharepoint®. However, whether an institution or program chooses to make use of subcontract management is an individual decision and may not influence this particular AoL maturity level. More specifically, a school or program may or may not choose to use the services of consultants or use a standardized test like the Educational Testing Services (ETS®) exam.

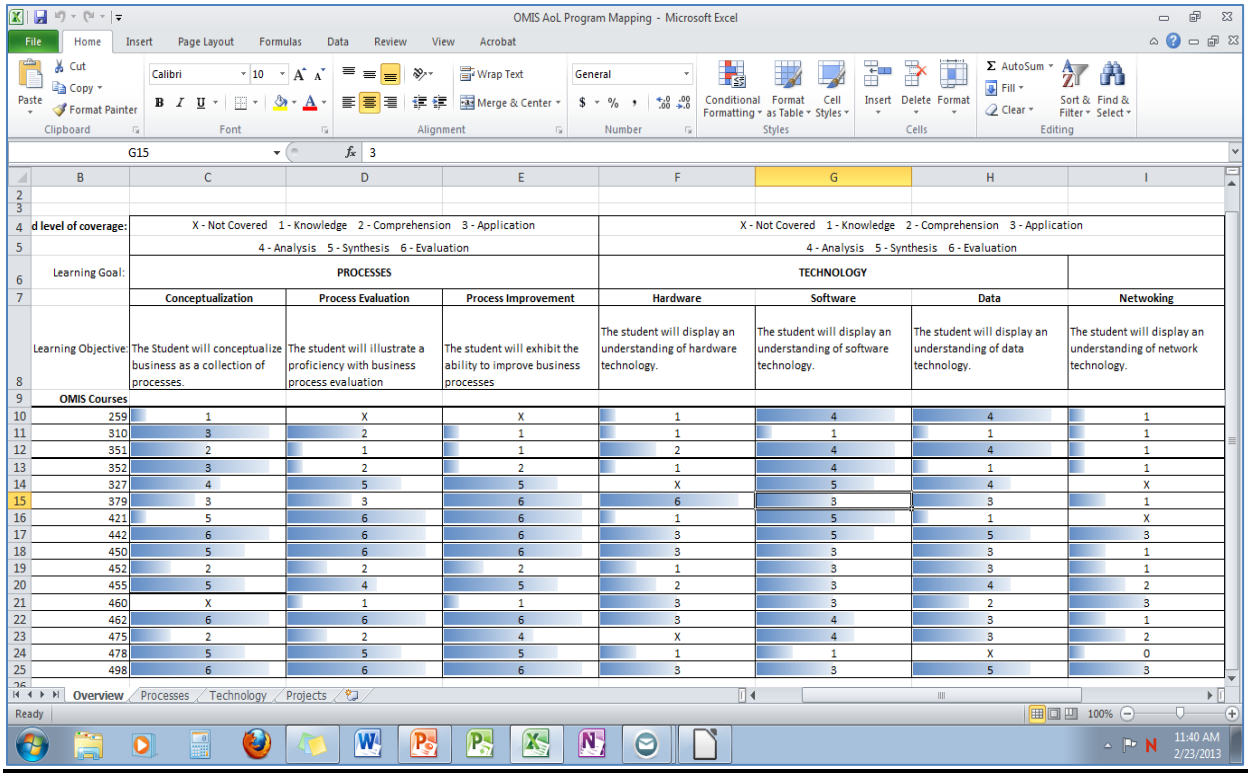


Figure 3: A Mapping of Learning Goals to Curriculum.

Level 3: Defined

At Level 3, AoL processes are documented and standardized throughout the organization and become the organization's standard process. Moreover, a group is established to oversee the organization's AoL processes and an organization-wide training program to support the standard process is implemented. Thus, activities, roles, and responsibilities are well defined and understood throughout the organization. The AoL process capability of this level is characterized as being standard, consistent, stable, and repeatable. However, this standard AoL process may be tailored to suit the individual characteristics or needs of an individual AoL project.

Key Process Areas.

- Peer reviews—includes a governing body that has the purpose and function to coordinate all AoL activities. Ideally, this should be a team that meets often and includes key stakeholders from different programs and communicates with other governing bodies such as department and college-level curriculum committees. The committee should focus on promoting best practices in order to identify and correct AoL process inefficiencies.
- Intergroup coordination—allows for an interdisciplinary approach where the AoL governance team participates actively with other departments in order to produce a more effective and efficient AoL process.
- Curriculum design and development—defines a consistent and effective set of integrated AoL activities and processes in order to produce a curriculum that enhances student learning.
- AoL integrated curriculum—supports the integration of AoL activities into a set of well-defined and understood processes that are tailored to the school or program.

- Communication and training programs—facilitates the development of individuals' skills and knowledge so that faculty or instructors may perform their AoL roles and duties more effectively and efficiently.
- Organization process definition and focus—supports the identification and development of a usable set of AoL processes that improve the capability of the organization across all AoL projects.

It appears that the requirements for Level 3 by the business school described in this paper are met. The formation of the A-Team in conjunction with a university-level office of assessment provide peer reviews of each department and program to ensure that AoL activities meet the standards for accreditation. In addition, intergroup coordination is supported by the Sharepoint® repository where assessment rubrics, data collection, assessment schedules and timetables, and reports are stored. The College of Business also sponsors several faculty development workshops that focus on AoL-related topics each semester as well as a periodic newsletter that highlight AoL activities and successes. The AoL liaison supports the key process area concerning AoL organization process definition and focus by coordinating both AACSB accreditation and AoL activities throughout the college.

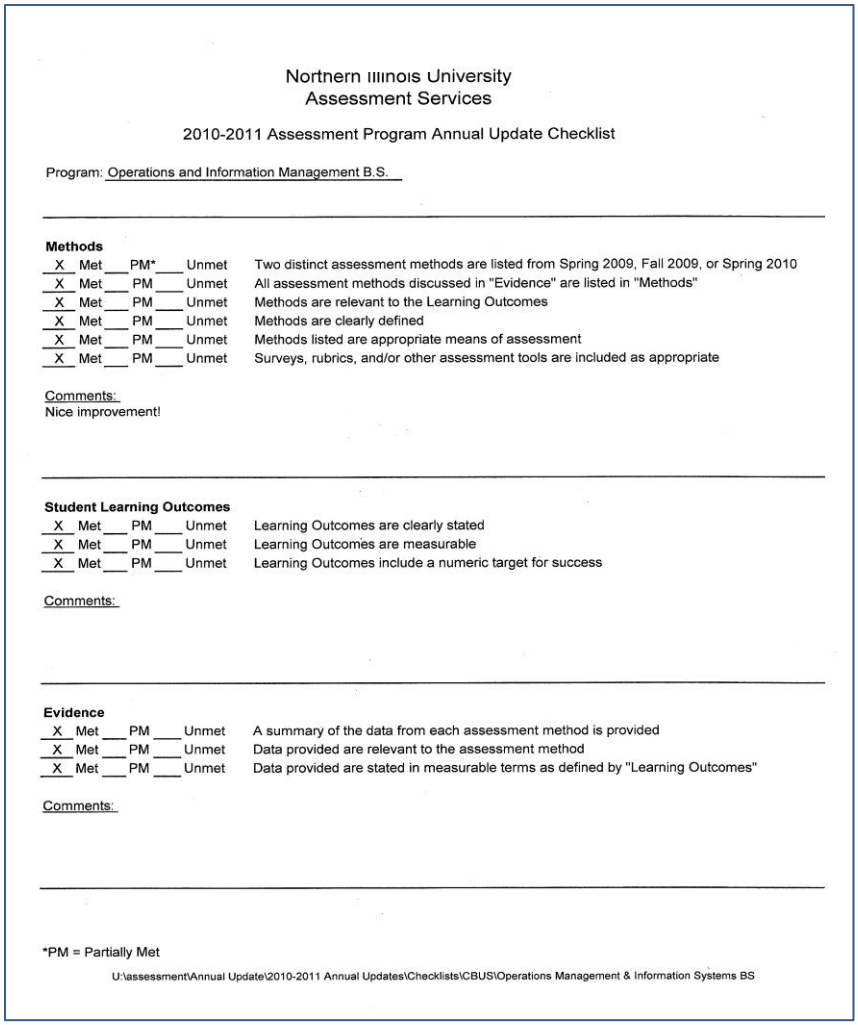
Level 4: Managed

At this level, quantitative metrics for measuring and assessing AoL productivity and quality are established. This information is collected and stored in an organization-wide repository that can be used to analyze and evaluate software processes and products. Control over projects is achieved by reducing the variability of AoL performance so that it falls within acceptable control boundaries. The AoL processes at this level are characterized as being quantifiable and predictable because quantitative controls are in place to determine whether the process performs within operational limits. Moreover, these controls allow for predicting trends and identifying when assignable causes occur that require immediate attention.

Key Process Areas.

- Quality management—establishes a set of processes to support the AoL project's quality objectives and AoL project quality management activities.
- Quantitative process management—provides a set of quantitative or statistical control processes to manage and control the performance of the AoL project by identifying assignable cause variation.

While the College of Business meets the requirements for Level 3, it does not meet all of the requirements for Level 4. The quality management key process appears to be met as university, college, department, and specific program reviews allow for the setting (and resetting) of specific AoL quality objectives. Figure 4 provides an example of a university assessment program review that annually verifies the quality of the AoL activities.



Northern Illinois University
Assessment Services

2010-2011 Assessment Program Annual Update Checklist

Program: Operations and Information Management B.S.

Methods

X Met ___ PM* ___ Unmet	Two distinct assessment methods are listed from Spring 2009, Fall 2009, or Spring 2010
X Met ___ PM ___ Unmet	All assessment methods discussed in "Evidence" are listed in "Methods"
X Met ___ PM ___ Unmet	Methods are relevant to the Learning Outcomes
X Met ___ PM ___ Unmet	Methods are clearly defined
X Met ___ PM ___ Unmet	Methods listed are appropriate means of assessment
X Met ___ PM ___ Unmet	Surveys, rubrics, and/or other assessment tools are included as appropriate

Comments:
Nice improvement!

Student Learning Outcomes

X Met ___ PM ___ Unmet	Learning Outcomes are clearly stated
X Met ___ PM ___ Unmet	Learning Outcomes are measurable
X Met ___ PM ___ Unmet	Learning Outcomes include a numeric target for success

Comments:

Evidence

X Met ___ PM ___ Unmet	A summary of the data from each assessment method is provided
X Met ___ PM ___ Unmet	Data provided are relevant to the assessment method
X Met ___ PM ___ Unmet	Data provided are stated in measurable terms as defined by "Learning Outcomes"

Comments:

*PM = Partially Met

U:\assessment\Annual Update\2010-2011 Annual Updates\Checklists\CBUS\Operations Management & Information Systems BS

Figure 4: Example of a University Program Assessment Report.

The College of Business, at this time, does not meet the quantitative process management key process area. However, an attempt is being made to improve such things as understanding and improving the motivation of students participating in AoL, choosing the best quantitative indicators or direct measures, ensuring an appropriate sample size is used, and improving the validation of the existing measures used so that there is more confidence in the decisions made from the assessment data collected.

Level 5: Optimizing

At the highest level of AoL process maturity, the whole AoL organization is focused on continuous process improvement. These improvements come about as a result of innovations using new technology and methods as well as incremental process improvement. Moreover, the school or program has the ability to identify its areas of strengths and weaknesses. Innovations and best practices based on lessons learned are identified and disseminated throughout the organization.

Key Process Areas.

- Process change management—supports the continual and incremental improvement of the Aol processes used by the organization in order to improve quality, increase productivity, and decrease the cycle time for closing the loop.
- Technology change management—supports the identification of new technologies (i.e., processes, methods, tools, best practices) that would be beneficial to the organization and ensures that they are integrated effectively and efficiently throughout the organization.
- Defect prevention—supports a proactive approach to identifying and preventing defects.

As an organization's AoL process maturity increases, the difference between expected results and actual results narrows. In addition, performance can be expected to improve when maturity levels increase because costs and development time will decrease, while quality and productivity increase.

Since the College of Business does not meet all of the key process requirements for Level 4, it cannot be at Level 5, even if some or all of the Level 5 key process areas are met. However, some examples of these key process areas can be described. To meet the standard for process change management, an AoL process may allow for making an appropriate decision in choosing the best rubric. Another process may focus on improving upon the culture of the college to support and believe in the value of AoL so that there is less faculty resistance. Technology change management may be supported in terms of using information technology tools that support AoL processes explicitly or even through the adoption of the CMM framework proposed in this paper. Lastly, an obvious example of defect prevention may include processes to make fewer mistakes, but a more visionary view might be to develop an early warning system to identify problem areas. The key here is to be more proactive than reactive to potential issues, problems, and challenges.

DISCUSSION AND CONCLUSIONS

According to the SEI, skipping maturity levels is counter-productive. If an organization was evaluated at Level 1, for example, and wanted to skip to Level 3 or Level 4, it might be difficult because the CMMI identifies levels an organization must evolve in order to establish a culture and experiences. Similarly, a school or program interested in improving its AoL processes and maturity level should follow this same evolutionary approach. For example, the establishment of a governing body is a foundation for each level above the first or initial level. This group is important for establishing AoL project plans and schedules at level 2 as well as providing reviews and coordination at level 3. Subsequently, the key process areas associated with quality management at level 4 and continuous improvement at level 5 could not be supported unless these earlier key process areas are met.

Moreover, the implementation of a repository is also a basic requirement for not only storing documents and data, but also for improving communication and coordination as outlined at Level 3. The data collected about AoL project processes can provide an underpinning for process capability, maturity, and continuous improvement required for the higher levels of the model.

The need for AoL and AoL process maturity has a number of benefits and challenges. AoL is not only a requirement for accreditation, but should be viewed at a much higher level: To improve student learning through the delivery of quality curriculum and programs. Hopefully, this can lead to greater relevance of the curriculum and student satisfaction with their majors or programs. This may lead to increased enrollment and the recognition for program excellence.

Other benefits include a common language and clarity of focus for schools or programs just getting started with AoL. As several studies discussed previously suggest, AoL activities are increasingly requiring more funds and taking up valuable faculty time. On the other hand, a focused set of AoL process may require fewer resources and reduce the number of inefficient and ineffective activities. Hopefully, this can keep administrative budgets under control and get more buy in from the faculty. Lastly, mature AoL processes hold the promise of being scalable as new programs or areas of study are introduced.

However, there are a number of challenges to implementing an AoL maturity model. The first is the time-honored challenge of getting people (i.e., faculty) to let go of the old ways even if perceived as successful in the past. A second challenge is having stakeholders get away from the "check box" mentality where people go through the motions of AoL in order to comply with the least amount of effort. This can apply to both faculty and students who may not see or understand the need and value of AoL. On the other hand, administrators may create an AoL bureaucracy that values following the process no matter what the circumstances.

The application of the CMM focused originally on better managing software projects. The extension of this model to other disciplines and organizational challenges may be indicative of the maturing of the information systems field. While this paper focused mainly on Assurance of Learning activities to meet AACSB accreditation standards, the ideas and processes may be applicable to satisfy other accreditation agencies such as Accreditation Board for Engineering and Technology (ABET)—an accrediting agency with over 3,100 applied science, computing, engineering, and engineering technology programs at more than 670 colleges and universities in 24 countries.

Finally, there will be a real need for additional resources and commitment from administration. However, the value of having a maturity model allows for understanding where a school or program stands today, what it will need to do next, and where it intends to go so that funds and resources are used appropriately. Regardless whether a school or program is interested in accreditation, its mission and goal should be to improve constantly.

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