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Logging in to Learning Analytics

Edna J. Presslerⁱ Education Development Centerⁱⁱ

ABSTRACT

According to the most recent Higher Education Editions of the Horizon Report (Johnson et al., 2013; Johnson, Adams, & Cummins, 2012; Johnson, Smith, Willis, Levine, & Haywood, 2011), learning analytics (LA) is an emerging technology that will be widely adopted within the next few years. In this article, I use the McKinsey 7S Model (Waterman, Peters, & Phillips, 1980) as a way to organize a review of the learning analytics (LA) literature, in order to help organizational leaders assess and increase an organization's readiness for LA. More specifically, I identify the 7 areas of an organization that need to be aligned for optimal performance; and explain what suggestions and cautions the current LA literature offers in relation to each of the 7 areas.

KEYWORDS: learning analytics; organizational assessment; McKinsey 7S, higher education, online education

INTRODUCTION

“Learning analytics” is defined by the Society for Learning Analytics Research (SOLAR) as: “The measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environment in which it occurs” (“About,” n.d., para. 3). According to the most recent Higher Education Editions of the Horizon Report (Johnson et al., 2013; Johnson, Adams, & Cummins, 2012; Johnson, Smith, Willis, Levine, & Haywood, 2011), learning analytics (LA) is an emerging technology that will be widely adopted within the next few years. In this article, we use the McKinsey 7S Model (Waterman, Peters, & Phillips, 1980) to organize a summary of the LA research and to offer support to leaders who want to assess and increase their institution's readiness for LA. More specifically, we describe the seven areas of an organization that need to be aligned for optimal performance and explain what suggestions and cautions the current LA literature offers in relation to each of these areas.

What do leaders in the assessment of student learning and development have to gain by welcoming the arrival of LA? To quote Long and Siemens (2011):

The idea is simple yet potentially transformative: analytics provides a new model for college and university leaders to improve teaching, learning, organizational efficiency, and decision making and, as a consequence, serve as a foundation for systemic change (p. 32).

The enthusiasm of Siemens and Long is shared by many others in the higher education field (e.g., Campbell & Oblinger, 2007; Crow, 2012; Oblinger, 2012a, 2012b;

Parry, 2012; and, Buckingham Shum, 2012b). In a study of the current state of LA, Bichsel and Grajek (2012, June) found that the vast majority (84%) of institutions believed LA was more important for the success of higher education now than two years ago and (86%) anticipated that it will be even more important two years from now. Unfortunately, there are risks inherent in acting too soon as well as in acting too late (Stiles, 2012).

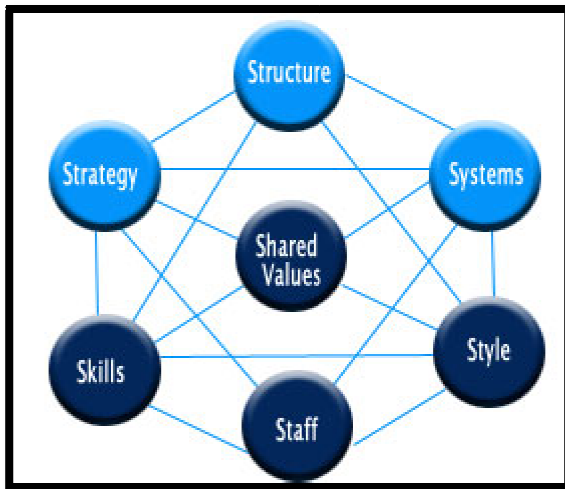


Figure 1: The McKinsey 7S Model (Source: McKinsey & Company)

According to Waterman, Peters, and Phillips (1980), an organization needs to be aligned in seven areas to perform well: shared values (super-ordinate goals); strategy; structure; systems; style; staff; and, skills. The model they formulated—known as the McKinsey 7S—has been widely used over the past 30 years to prepare for and implement various organizational changes (Carter & Carmichael, 2009; McKinsey & Company, 2008; Peters, 2011). By comparing the current situation to a proposed future situation, the McKinsey 7S Model helps to identify vulnerabilities and inconsistencies that could otherwise undermine change efforts (“The McKinsey 7S Framework,” n.d.). Proponents suggest organizations should use the 7S model to assess and increase readiness for any significant initiative.

Shared Values: What ideas are commonly held regarding what is considered “right and desirable” for the organization and for individuals (McKinsey & Company, 2008, p. 112)? How are these ideas evidenced in the culture and work ethic (“The McKinsey 7S Framework,” n.d.)?

Suggestions:

Booth (2012) suggests that the adoption of analytics be guided by the “9 Principles of Good Practice for Assessing Student Learning,” published in 1992 by the American Association for Higher Education’s (AAHE) Assessment Forum, “if learning analytics is ultimately to be a transformative set of practices and tools for improving student learning” (p. 52).

9 Principles of Good Practice for Assessing Student Learning (Astin et al., 1992)

- The assessment of student learning begins with educational values.
- Assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time.
- Assessment works best when the projects it seeks to improve have clear, explicitly stated purposes.
- Assessment requires attention to outcomes but also and equally to the experiences that lead to those outcomes.
- Assessment works best when it is ongoing not episodic.
- Assessment fosters wider improvement when representatives from across the educational community are involved.
- Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about.
- Assessment is most likely to lead to improvement when it is part of a larger set of conditions that promote change.
- Through assessment, educators meet responsibilities to students and to the public.

Cautions:

Learning analytics efforts that are not guided by such values or principles could result in collection of data that is:

- (incorrectly) assumed to be ethical, just because it is accessible (Boyd & Crawford, 2011; Brown, 2012)
- superficial or simplistic (Buckingham Shum, 2012a, 2012b; Buckingham Shum & Ferguson, 2011; Parry, 2012; Shattuck, 2012; Siemens, 2012b)
- treated as more objective and accurate than it actually is (Boyd & Crawford, 2011; Griffiths & Getis, 2012)
- used for purposes unrelated and even antithetical to student learning (Buckingham Shum, 2012; Parry 2012).

Shared Values (or Super-ordinate Goals): What ideas are commonly held regarding what is considered “right and desirable” for the organization and for individuals (McKinsey & Company, 2008)?

7S Checklist Questions (“The McKinsey 7S Framework,” n.d.)

Shared Values:

- What are the core values?
- What is the corporate/team culture?
- How strong are the values?
- What are the fundamental values that the company/team was built on?

Strategy: What actions are taken to gain and maintain competitive advantage (McKinsey & Company, 2008)?

Suggestions:

Suggested steps for developing a learning analytics strategy include:

- arrange informal discussions with key stakeholders on campus to elicit their concerns and priorities (Campbell & Oblinger, 2007)
- list the institutional pressures that analytics could address on your campus (Campbell & Oblinger, 2007)
- clarify what you hope to achieve (whether on the level of the individual, course, department, or institution) and ensure it is consistent with institutional priorities (Campbell & Oblinger, 2007; Cavanagh & Dziubian, 2012)
- help stakeholders see the connection between learning analytics and institutional priorities (Griffiths & Getis, 2012; Smith, 2012, 2011; Wagner & Ice, 2012)
- design projects with the ultimate audience(s) in mind (Brown, 2012, 2011; Brown & Diaz, 2011; Ferguson, 2012; Siemens, 2011b)
- identify what data your organization currently collects (Brooks, 2012a; Petersen, 2012; Pistilli & Arnold, 2012; Pistilli, Arnold, & Bethune, 2012; Sharkey, 2012; Smith, 2012, 2011; Soares, 2012)
- craft the questions you will need to ask in order to achieve your goals and select relevant data (Brown, 2012; Educause, 2011; Griffiths & Getis, 2012; MacFadyen, 2012; Swan, 2011; Tozman, 2012; Wilkinson & Crews, 2011)
- develop a list of other organizations that are using learning analytics to address similar problems, particularly among peer institutions, and gather information about their experiences (Campbell & Oblinger, 2007; Wagner & Ice, 2012)
- compare learning analytics project(s) with alternative methods to achieve the same or similar goals (Campbell & Oblinger, 2007)
- estimate ROI based on potential costs (dollars, staff support, faculty time, etc.,) and potential benefits (reduced costs of remediation, increased retention, etc.) (Campbell & Oblinger, 2007; Petersen, 2012)
- consider whether the project can be conducted incrementally (Brown & Diaz, 2011; Campbell & Oblinger, 2007)
- determine what obligations will arise for the institution, faculty, and/or students if the analytics generate actionable results (Campbell, 2012; Siemens, 2011b)

Cautions:

The primary caution is not to expect *immediate* full and enthusiastic support from all stakeholders. As Smith (2012) points out, “analytics is not just a tool but also a business and change process, and as such, it’s useful to consider successful organizational approaches to change....” (Diaz & Brown, p. 10). In order to increase acceptance of and participation in learning analytics, the concerns of each constituency need to be addressed (Campbell & Oblinger, 2011; Messineo, 2011; Oblinger, 2012).

Executive officers may be concerned about privacy, security, return on investment, and, results that are unfavorable for the institution (Campbell & Oblinger, 2007).

- IT may be concerned about the need to adopt new systems, respond to new expectations, and hire new staff with the necessary skills (Campbell & Oblinger, 2007).
- Student Affairs personnel may be concerned about encroachment into their area of student development, inaccurate identification of students at risk, and/or inadequate resources to assist those who are accurately identified (Campbell & Oblinger, 2007).
- Faculty may be concerned about evaluations of their effectiveness, limitations on their autonomy, and/or imposition of additional responsibilities (Campbell & Oblinger, 2007; Educause, 2011; Messineo, 2011; Oblinger, 2012b).
- Students may be concerned about privacy, accuracy, and impersonality (Campbell & Oblinger, 2007; Educause, 2011; Oblinger, 2012b).

Strategy: What actions are taken to gain and maintain competitive advantage (McKinsey & Company, 2008)?

7S Checklist Questions (“The McKinsey 7S Framework,” n.d.)

Strategy:

- What is our strategy?
- How do we intend to achieve our objectives?
- How do we deal with competitive pressure?
- How are changes in customer demands dealt with?
- How is strategy adjusted for environmental issues?

Structure: Who reports to whom and how is responsibility for tasks distributed and integrated (McKinsey & Company, 2008)?

Suggestions:

In a recent survey, Bichsel and Grajek (2012) found a number of different structures in support of LA: institutional leadership (president/chancellor); area leadership (provost/CBO); a dedicated LA leader; an operational unit (IT/IR); but, most often, multiple leaders. Among the institutions surveyed, the responsibility for services and activities was most often fulfilled by IT and/or IR. The focus of those LA services/activities was most often in the student and financial areas and least often in faculty areas. While there was no one structure identified as optimal, Bichsel and Grajek (2012) did find that institutions with strong analytics programs were facilitated by substantial collaboration between IT and IR, an observation that others have made as well (e.g., Smith, 2011).

Cautions:

While clear lines of authority and distribution/integration of responsibilities are desirable (even if the location of those lines may vary across institutions), the reality is that people at the systems/enterprise level, researchers, and educators may operate independently and possibly redundantly. Even if there is strong support for learning analytics among various constituencies, the “silo-ed” nature of many/most universities

may make it difficult to move forward in a streamlined way (Booth, 2012; Brooks, 2012b; Campbell, 2012; Diaz & Brown, 2012; Little, 2012; Siemens, 2012a, 2012c). Booth (2012) therefore urges educational technologists, instructional designers, assessment specialists, faculty developers, and learning consultants to dismantle any barriers to “working and learning together” (p. 53).

Structure: Who reports to whom and how is responsibility for tasks distributed and integrated (McKinsey & Company, 2008)?

7S Checklist Questions (“The McKinsey 7S Framework,” n.d.)

Structure:

- How is the company/team divided?
- What is the hierarchy?
- How do the various departments coordinate activities?
- How do the team members organize and align themselves?
- Is decision making and controlling centralized or decentralized? Is this as it should be, given what we're doing?
- Where are the lines of communication? Explicit and implicit?

Systems: What processes and procedures are used to complete tasks (McKinsey & Company, 2008)?

Suggestions:

The specific processes and procedures each institution uses will depend on its LA strategy and structure. In general, however, institutions need to have (documented) systems in place to ensure appropriate:

- granting of permission/approval from IRB and other relevant departments (Campbell & Oblinger, 2007; Roush, 2012)
- data collection/exclusions (e.g., Brown, 2012; Brown & Diaz, 2011; Campbell, 2012; Diaz, 2012; Fritz, 2012; Long & Siemens, 2011; MacFadyen, 2012; McElroy, 2012; Siemens, 2012a, 2012b; Shattuck, 2011)
- data quality (Brooks, 2012a; Siemens, 2012a; Stiles, 2012)
- data storage/retention/recovery (Siemens, 2012a, 2012b; Stiles, 2012)
- data access/sharing (Buckingham Shum, 2012; Campbell & Oblinger, 2007; Milliron, 2012; Soares, 2011; Stiles, 2012)
- privacy/security of data (Educause, 2010, 2011; Siemens, 2011a; Stiles, 2012)
- data extraction and analysis (e.g., Baron, 2012; Campbell & Oblinger, 2007; Sharkey, 2012; Siemens, 2012a; Siemens et al., 2011; Strader & Thielle, 2012)
- data reporting (Brown & Diaz, 2011; Campbell & Oblinger, 2007; Siemens, 2012a; Smith, 2011)
- improvement/refinement of processes and procedures (Campbell & Oblinger, 2007; Siemens, 2011b; Siemens & Smith, 2011)
- action/accountability in response to results of LA projects/program (Baron, 2012; Brown, 2011; Campbell, 2012)

Cautions:

According to Siemens's (2012c) keynote address at the most recent Learning Analytics and Knowledge Conference, a significant gap currently exists between research and practice in the area of LA. Vendors have stepped in to bridge this gap by developing products and services, but their work is usually considered proprietary (Siemens, 2012b; Siemens et al, 2011). Siemens (2012c) cautions that "the growing prominence of protected IP can hinder iterative and rapid improvements to LA techniques" (p. 1); others in the field also advocate for open systems (e.g., Baron, 2012; Brooks, 2012a; Little, 2012). And while Siemens (2012c) does not believe that improved communication between researchers, vendors, and practitioners [such the panelists in the May 3, 2012 CIEE launch event discussed above] will close the research-practice gap entirely, he does believe that it could make each more aware of the needs and contributions of the other (Siemens, 2012c).

Systems: What processes and procedures are used to complete tasks (McKinsey, 2008)?
7S Checklist Questions ("The McKinsey 7S Framework," n.d.)

Systems:

- What are the main systems that run the organization? Consider financial and HR systems as well as communications and document storage.
- Where are the controls and how are they monitored and evaluated?
- What internal rules and processes does the team use to keep on track?

Style: What style of leadership is adopted ("The McKinsey 7S Framework," n.d.)? How do managers characteristically engage their time, attention, and symbolic activity (McKinsey & Company, 2008)?

Suggestions:

Writers/researchers have drawn attention to the importance of organizational culture in the success of any learning analytics project. Learning analytics projects are more likely to thrive in organizations with an orientation toward "collaborative scholarship" (Booth, 2012), "continuous improvement" (Smith, 2012; Soares, 2012), "quantitative approaches" (Campbell & Oblinger, 2007), a "culture of evidence" (Petersen, 2012) and/or "a culture of assessment" (Hrabowski, Suess, & Fritz, 2011).

Cautions:

When learning analytics projects are not a natural fit with current organizational culture, efforts will need to be made not only to develop the learning analytics initiative, but also a culture conducive to it (Campbell & Oblinger, 2007; Hrabowski, Suess, & Fritz, 2011; Stiles, 2012).

Style: What style of leadership is adopted (“The McKinsey 7S Framework,” n.d.)? How do managers characteristically engage their time, attention, and symbolic activity (McKinsey & Company, 2008)?

7S Checklist Questions (“The McKinsey 7S Framework,” n.d.)

Style:

- How participative is the management/leadership style?
- How effective is that leadership?
- Do employees/team members tend to be competitive or cooperative?
- Are there real teams functioning within the organization or are they just nominal groups?

Staff: What are the organizational demographics (not the personalities) of the people in the organization (McKinsey & Company, 2008)? Their general capabilities (“The McKinsey 7S Framework,” n.d.)?

Suggestions:

Successful learning analytics projects require input from various constituencies on campus (and potentially beyond); the projects, then in turn, produce “output” with important implications for those constituencies (Campbell & Oblinger, 2007; Educause, 2011; Smith, 2012). A number of departments/divisions with personnel whose areas of expertise could be especially relevant for learning analytics, including:

- provost’s and deans’ offices
- centers for faculty development
- centers for instructional design/development/technology
- enrollment management
- institutional research
- statistics, education, and computer science departments
- IT (including LMS administrators, programmers, user interface experts)
- IRB
- student services

Personnel from other units can be included, as needed, in order to increase awareness and investment in the projects as well as to improve their quality and credibility (Brown & Diaz, 2011; Campbell & Oblinger, 2007). Job descriptions should include learning analytics responsibilities, so as to convey their importance (Brown & Diaz, 2011).

Cautions:

According to Smith (2011) in “Bootstrapping Your Analytics,” if personnel do not buy into the learning analytics process, contribute to its development, and/or understand its results, they will not use it. In addition, if personnel experience learning analytics as extra work, without any additional resources/rewards/recognition, they may not be able/willing to give it the attention it deserves.

Staff: What are the organizational demographics (not the personalities) of the people in the organization (McKinsey & Company, 2008)? Their general capabilities (“The McKinsey 7S Framework,” n.d.)?

7S Checklist Questions (“The McKinsey 7S Framework,” n.d.)

Staff:

- What positions or specializations are represented within the team?
- What positions need to be filled?
- Are there gaps in required competencies?

Skills: What are the skills and competencies of the employees (“The McKinsey 7S Framework,” n.d.)? What are the capabilities of the organization, above and beyond those of its individual employees? (McKinsey & Company, 2008).

Suggestions:

The skills necessary for a successful learning analytics program will depend, to some degree, on each of the six areas already discussed. However, the literature does suggest certain areas to consider:

You will need a “project champion,” someone who is capable of building infrastructure and enthusiasm for your learning analytics program (Smith & Siemens, 2011).

You will need an IT department that has not only the technical ability for “end-to-end implementation” of a learning analytics program, but also a sensibility about the critical issues for the institution that the learning analytics program(s) will address (Campbell & Oblinger, 2007, p. 16). If the current staff members do not have all the necessary knowledge and skills (which is often the case), they may need to seek out additional education themselves and/or the expertise of others on campus (Campbell & Oblinger, 2007). Individuals who are strong in statistics (including predictive modeling), programming, computer interface and end user experience design, and/or learning outcomes and assessment could be important allies in the learning analytics effort (Campbell & Oblinger, 2007; Smith, 2011).

While evaluation and revision have always been an important part of instructional design and development, the unprecedented access to “real time” data about what/how students are learning both enables and demands “real time” responses. To best support faculty and students, you will need instructional designers who can use learning analytics information to guide “micro-interventions” (Brooks, 2012b) or “rapid prototyping” (Daugherty, Teng, & Cornachione, 2007; Ni & Branch, 2008) on-line and in the classroom.

In their article, “Five Dirty Little Secrets in Higher Education,” Noone and Swenson (2001) assert that “professors know a lot about their disciplines and very little about teaching” and “professors know even less about learning than they do about teaching” (p. 24-26). As a result, it is not surprising that Wagner and Ice (2012) ask, “How will educators respond to growing expectations around data-driven decision making when their ‘art of teaching’ may be confounded by empirical evidence to the contrary?” (p. 40). To help ensure that the faculty response to learning analytics is a positive and productive one, you will need high-quality faculty development services (Campbell & Oblinger, 2007; McElroy, 2012).

Finally, for your learning analytics program to be successful, you will need students who are “purposeful,” “engaged,” and “tenacious” in their pursuit of education (Milliron, 2012).

At this early point in the history of learning analytics, most of the necessary skills are developed in other fields or “on the job.” Education and training in the specific area of learning analytics is not yet easily accessible (Siemens, 2012c). According to Siemens (2012c), only a few universities currently offer master’s degree programs in [business, not learning] analytics and none offer doctoral programs. Certificate programs for university leaders and administrators are being developed, but are not yet available (Siemens, 2012c). However, this survey of the literature of the literature and case study of one institution’s attempt to launch an LA initiative may provide a starting point for others.

Skills: What are the skills and competencies of the employees (“The McKinsey 7S Framework,” n.d.)? What are the capabilities of the organization, above and beyond those of its individual employees? (McKinsey & Company, 2008).
7S Checklist Questions (“The McKinsey 7S Framework,” n.d.)

Skills:

- What are the strongest skills represented within the company/team?
- Are there any skills gaps?
- What is the company/team known for doing well?
- Do the current employees/team members have the ability to do the job?
- How are skills monitored and assessed?

We suggest that any organization assessing its readiness to engage in learning analytics must reflect on the status of the organization in each of the 7 areas outlines the McKinsey 7S Framework. To complete such an assessment, the organization also needs to examine the interactions among and across the 7 areas. The following questions (adapted from “The McKinsey 7S Framework,” n.d., Matrix Questions) are helpful for such an assessment:

Are your institution’s values consistent with its structure, strategy, and systems? To what extent are the values evidenced in the style, staff, and skills? Do the values have the potential to support or sabotage a learning analytics program? What needs to change, if anything?

How well do the strategy, structure, and systems support each other? Where would changes need to be made in order to provide a solid foundation for a learning analytics program?

How well do the style, staff, and skills support the strategy, structure, and systems? How well do they support one another? Where would changes need to be made in order to have a unified and cohesive approach to learning analytics? The better all seven areas are aligned around your LA initiative, the more successful and satisfying it will be.

“Committing yourself to building those skill-sets you don’t currently possess... [is] a transformative process, and transformations are rarely easy” (Milliron, 2012, p. 26). This is just as true for us and our institutions as it is for our students. Fortunately, we have the McKinsey 7S Model, suggestions and cautions from the LA literature to guide us in this process. As we delve deeper into this new area, we believe more deeply that learning analytics can enable us to transform our assumptions about education into evidence of impact, but first we had to “log in” and join the larger community involved in this pursuit.

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