

Is Higher Education Talking and Walking Agile Management: A Review of the Literature

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ABSTRACT : *Agile is embraced by industries of all kinds and all sizes of organizations from software development to general management. Agile practices brought technology-enabled platforms which disrupt existing industry structures and enable businesses to meet the faster changing customer's expectations. To satisfy the constantly changing needs of business, higher education institutions have initiated some agile practices. However, their normally bureaucratic management style which is often a slow, laborious process is in stark contrast to the agile organization. In order to facilitate the research on how to embrace agile in higher education management, this paper reviewed the history and concept of agile, introduced the agile values, principles, methods and described the characteristics of agile organizations. The paper also reviewed agile assessing tools used by various consulting firms. The research concluded that leaders and practitioners in higher education had initiated agile to meet the demands of the business and labor market but the journey for higher education to embrace agile had just started. Further educational reforms, especially the organizational structure reforms are still needed to be enacted. This literature review provides important academic and practical value to the future research and practices in agile management area, especially, the agile higher education management.*

KEYWORDS - *Agile, Agile Values and Practices, Assessing Agile, Higher Education.*

I. INTRODUCTION

We are in an era of the Fourth Industrial Revolution which is characterized by “a fusion of the technologies that is blurring the lines between the physical, digital and biological spheres” (Schwab, 2016). The revolution will force companies to re-examine the way they do business - challenging them to review current business models and restructure a process which should remain competitive. As technology-enabled platforms disrupt existing industry structures, such as those we see within the “sharing” or “on demand” economy, business has been affected by new customer expectations, product enhancements, collaborative innovation and organizational forms. Government and state agencies which are normally run in a bureaucratic management style to comply with laws and regulations will need to embrace "agile" governance which empowers employees, just as the private sector has increasingly adopted agile responses to software development and business operations more generally (Schwab, 2016). In this literature review, we will explore the concept of agile including a brief history of the concept, discuss its effect on business today, report on agile assessment tools and finally discuss the need for agile in higher education.

II. WHAT IS AGILE?

Agile, by the face meaning of this word, is the ability to create and respond to change. It is a way of dealing with, and ultimately succeeding in, an uncertain and turbulent environment (Agile Alliance, n.d.). According to Project Management Institute (2017), agile can be “an approach, a method, a practice, a technique, or a framework” depending on the situation where it is used. Agile is also a mindset to generate more value at less work.

2.1 The History of Agile

Agile methodologies had early beginnings in scientific management and can be traced back to Plan-Do-Study-Act (PDSA) cycles for the improvement of products and processes created by Walter Shewhart in the 1930s'. Walther Shewhart mentored W. Edwards Deming who worked with the Japanese introducing the concept of Total Quality Management (TQM) which was a predecessor to the lean systems of today. In 1986, Hirotaka Takeuchi and Ikujiro Nonaka published an article in Harvard Business Review called “The New New Product Development Game” which identified a team-oriented approach based on studies of successful manufacturers who released new innovative products faster than their competitors. They compared the current process to a relay

race in which one group of functional specialists handed off its completed phase to the next functional specialists and referenced a rugby approach describing the new innovative companies where a team tries to go the whole distance as a unit, passing the ball back and forth.” (Rigby, D., Sutherland, J. and Takeuchi, H., 2016a, p.1). The new approach changed the design and development process for products such as copiers at Fuji-Xerox, automobile engines at Honda, and cameras at Canon. Based on the rugby approach, Jeff Sutherland created a new way of developing software, which he called “scrum” and was later introduced to the public in 1995. Scrum has been an iterative project management methodology that is most commonly used in software development but also suitable for any project-based work (Cooke, 2012).

As software became an integral part of nearly every business function, many software developers were working hard on better methods of programming to increase adaptability. In 2001, seventeen software developers hold a meeting in Snowbird, Utah to share their ideas. The achievement of the meeting was the signed Agile Software Development Manifesto, known as Agile Manifesto today. Agile Manifesto formalized agile movement which originated from software development and is “rapidly spreading to all parts, and all kinds of organizations” (Denning, 2016b, p.1).

2.2 Agile Values and Principles

Agile Manifesto (Beck et al., 2001) spelled out four key values of agile. See Fig. 1.

We are uncovering better ways of developing software by doing it and helping others do it.
Through this work we have come to value:
Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan
That is, while there is value in the items on the right, we value the items on the left more.

Figure 1. Agile Manifesto

Twelve principles of agile ((Principles behind the Agile Manifesto, n.d.) flowed from the above values:

- (1) Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
- (2) Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- (3) Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
- (4) Businesspeople and developers must work together daily throughout the project.
- (5) Build projects around motivated individuals. Give them the environment and support they need and trust them to get the job done.
- (6) The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
- (7) Working software is the primary measure of progress.
- (8) Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
- (9) Continuous attention to technical excellence and good design enhances agility.
- (10) Simplicity--the art of maximizing the amount of work not done--is essential.
- (11) The best architectures, requirements, and designs emerge from self-organizing teams.
- (12) At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

According to Denning (2016a), agile is a mindset described by the four values and twelve principles of Agile Manifesto, and manifested through unlimited practices, tools and processes. These values and principles provide guidance on how an agile organization creates and delivers value for customers in an environment of complexity and uncertainty. Various agile approaches and methods in practice today share common roots with the agile mindset, value, and principles. This relationship is shown in Fig. 2.

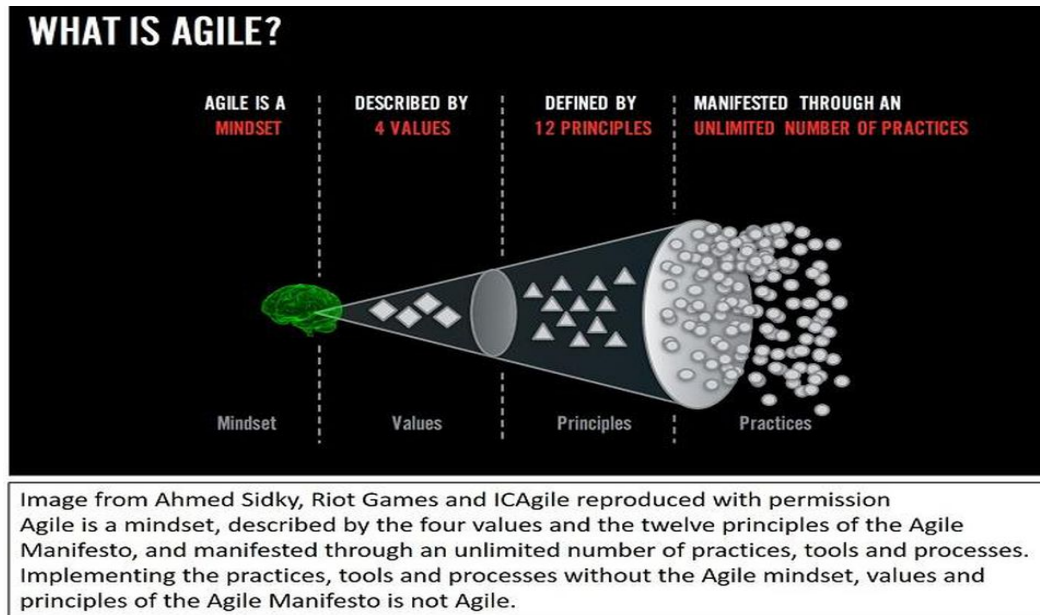


Figure 2. What is Agile by Denning (2016a)

2.3 Agile Methods and Practices

Methodology leads to practice. In the late 1980s and early 1990s, researchers from MIT coined the term “lean” to describe the system’s methods of improving productivity by eliminating waste (“muda”) through reductions in uneven workflows (“mura”) and destructive overburdening (“muri”). Eventually formal lean and kanban software-development systems emerged and were accepted as agile methodologies as they focused on customer collaboration (Rigby et al, 2016b).

Since Agile Manifesto was declared in 2001, all development frameworks that aligned with its values and principles would be known as agile techniques which continue to evolve. According to Agile Alliance (n.d.), “agile methodologies are the conventions that a team chooses to follow in a way that follows Agile values and principles”. Although agile practitioners sometimes have debates under the complex agile family tree of various methods and practices, they agree on two clear things: “first, agile’s roots extend far beyond information technology and, second, agile’s branches will continue to spread to improve innovation processes in nearly every function of every industry” (Rigby et al., 2016b). According to Denning (2016b), there are more than 40 types of agile methods and more than 70 agile practices (see Fig. 3).

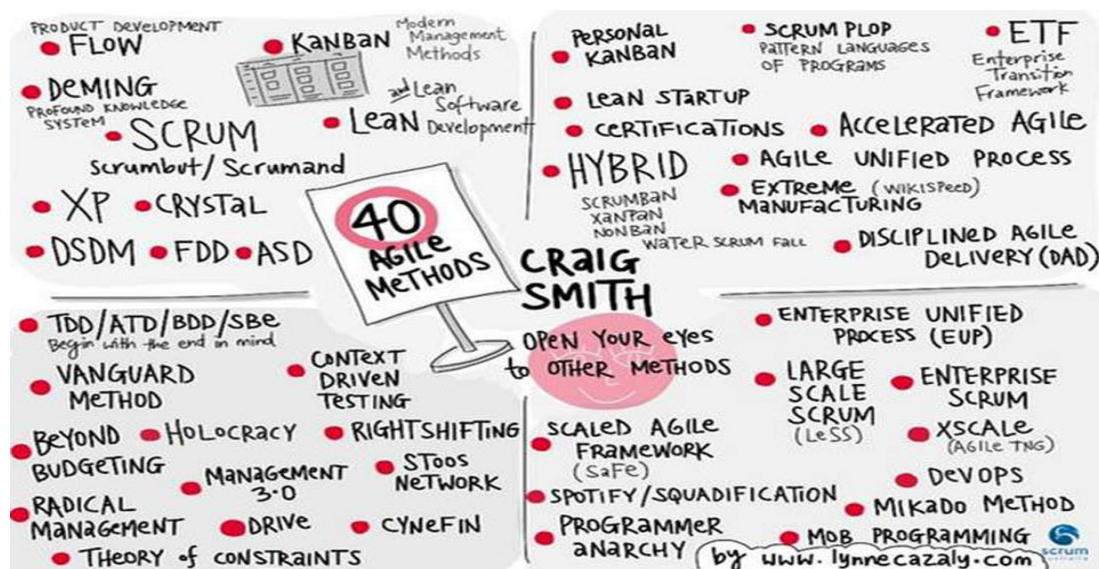


Figure 3. Agile Methods by Denning (2016b)

2.4 The Characteristics of the Agile Organization

According to Denning (2016b), in an agile organization, “self-organizing teams are continuously providing new value for customers. Because the work is done in an iterative fashion with continuous interaction with users, the organization can constantly upgrade what it does for each individual user, sometimes almost in real time (p.1).” In order to provide frictionless, intimate value at scale for the customers, the organizational structure of the team is different from the traditional bureaucratic teams because the traditional organizational bureaucratic structure does not suit for an agile team responding an agile team responding to fast changes and striving to find the solution to never-done problems. Also, agile management's primary process is different from the traditional management because it primarily focuses on delivering innovation and value to customers rather than making money for shareholders and top executives.

As shown in Fig. 4, traditional business follows a strict action sequence with a detailed business process model and implementation strategy which often needs approval at different levels to begin. This approach is not suitable for dynamic organizations because of the high degree of change and adjustment to new requirements (Martins, P., Zacarias, M. 2017). Agile teams are autonomous, cross-functional with much interaction.

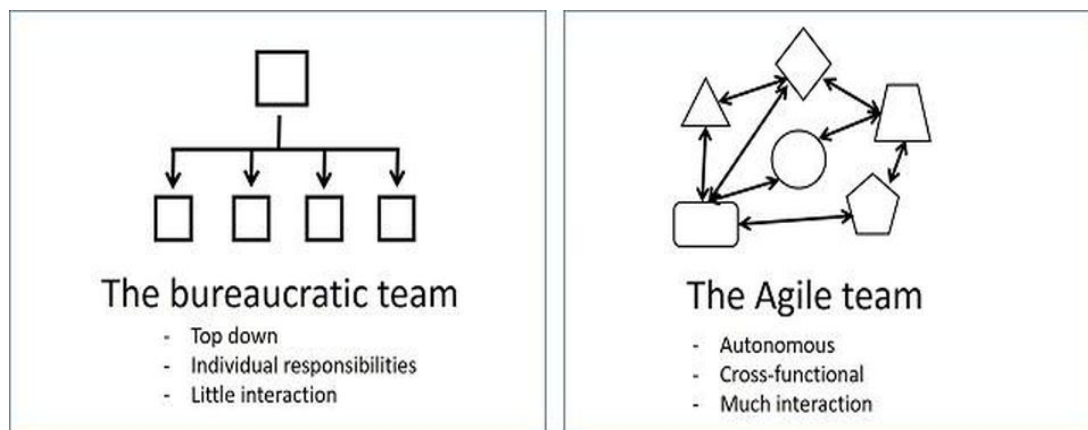


Figure 4. The Traditional Bureaucratic Team vs. The Agile Team

Being agile or the “agility” is important for agile organizations in all management levels. According to Denning (2015a, p.1), the vision for the agile concept is that leaders should see and act as enablers rather than controllers and embody the values of transparency and continuous improvement of products, services and work methods. All work should be coordinated through structured customer focused practices with open and conversational communication. Organizations that have embraced Agile have three core characteristics: the law of the small team, the customer and the network. Agile practitioners share a mindset that work is more effective when done in small autonomous cross-functional teams working in short cycles on with continuous feedback from the customer or end user. He further explains that keeping teams small allows them to break down tasks in short iterative work cycles which allows them to deliver more value to the customers while continuously adding more value working in an interactive network.

Livorsky (2016) defined agility as “the power to move quickly and nimbly while thinking on your feet and acting decisively”. She also stated that agility at a leadership level is “a mindset that facilitates rapid growth and the adoption of key business strategies” and helps leaders differentiate themselves on three key levels: Being able and willing to adapt to change; Remaining resilient in times of change and uncertainty; Learning from their experiences, including failures (p.1).

Cooke (2010) also stated that the purpose of the Agile philosophy was based on the " iterative delivery of business value in short time-frames, with ongoing planning based on the feedback received from key stakeholders at each iteration"(p.1). This is certainly true in business environments including educational facilities constantly adapting to necessary changes in industry to ensure that graduates are prepared for the workforce. His definition included three linked terms, ‘Apply, Inspect, Adapt’. He also noted that responsive planning allows for changes in the business environment or business educational environment to be implemented almost immediately instead of waiting for normal processes which could take anywhere from months to years depending on how many levels the changes need to go through in the organization prior to implementation.

Agility refers to the ability of an organization to respond quickly to demands or opportunities. It is a strategy that involves maintaining a flexible system that can quickly respond to changes in either the volume of demand or changes in product/service offerings. This is particularly important as organizations scramble to remain competitive and cope with increasingly shorter product life cycles and strive to achieve shorter development times

for new or improved products and services. In the context of supply chain management, being agile means that a supply chain is flexible enough to be able to respond quickly to unpredictable changes or circumstances, such as supplier production or quality issues, weather disruptions, changing demand (volume of demand or customer preferences), transporting issues, and political issues (Stevenson, 2018, p.657). That analogy can certainly be transferred to other areas of management.

III. AGILE EFFECTS ON BUSINESS TODAY

As agile processes transfer into business today, great benefits to management teams occur which adds to overall employee satisfaction and motivation leading to more innovation.

3.1 Agile Increases Team Productivity and Employee Satisfaction

According to Rigby et al. (2016b), the agile process increases team productivity and employee satisfaction while minimizing waste inherent in redundant meetings, repetitive planning, and excessive documentation. Since agile teams run more efficiently there is more time to work on quality defects and low-value product features which increase revenue. Management leaders teach that teams with high satisfaction produce more and are more effective ultimately increasing the bottom line for business. Customers changing priorities are the most important part of competition today and having efficient methods of quick delivery is no longer an option, but crucial to ensure customer engagement and satisfaction. It often requires the engagement of team members from multiple disciplines as collaborative peers which builds mutual trust and respect in the organization. Senior managers have more time to consider higher-value work such as creating and adjusting the corporate vision; prioritizing strategic initiatives; simplifying and focusing work; assigning the right people to tasks; increasing cross-functional collaboration; and removing impediments to progress with overall benefits to the teams and overall organization.

3.2 Agile Helps Managers to Overcome the Hierarchical Bureaucracy

Deming (2016b) stated that managers need agile to exploit digital technology or the Internet to overcome the hierarchical bureaucracy that is pervasive in big corporations while agile methodologies continue to spread across a broad range of industries. One example is Microsoft. The company was able to decrease their production cycles from three years to three weeks by adapting to the agile process. In the process, the physical workspace was redesigned with open space, fresh vibrant colors, comfortable meeting rooms creating opportunities to encourage collaboration in a pleasant and informal atmosphere (Denning, 2015b). They are now members of the Agile Alliance and help promote the concept at conferences based on the success of their teams. Large companies in a variety of industries are embracing agile. According to Rigby et al. (2016b),

“John Deere uses them to develop new machines, and Saab to produce new fighter jets. Intronis, a leader in cloud backup services, uses them in marketing. C.H. Robinson, a global third-party logistics provider, applies them in human resources. Mission Bell Winery uses them for everything from wine production to warehousing to running its senior leadership group” (p.1).

3.3 Agile Provides A Path for Employees to Develop and Enhance New Skills

Employees today are constantly training to keep up with the latest technology in all areas of business. For businesses to compete in the new world of technology and artificial intelligence, it will be necessary to streamline processes and change must be quick and valuable to the customer. Since the agile teams always need to deal with the uncertainties and complexity in the fast-changing environment and solve the new problems which have not been done before, the team members must develop and enhance new skills in real time. Learning-by-doing is a must for the employees in agile organizations.

In the next section, we will review the literature on assessing agile maturity in organizations. There are many assessment tools including surveys, games and checklists to determine what stage an organization or leadership team is currently in and the process of transformation into an agile system.

IV. ASSESSING AGILE

How do we know if our business, department or team is agile? In business theory disruption is an innovation which creates a new market and needs experts to introduce and explain the new phenomenon. Experts become consultants and the new phenomenon is born. There are many consultants and experts in the field today

and this article will review a few of the methods to understand the process. As organizations embrace the Agile Management model, organizations begin looking within to ensure that priorities and resources are continually checked for alignment. Many consultant firms are producing self-assessment tools, games and other tools to assist organizations in the transformation process.

Scrum Checklist created by Henrik Kniberg of Crisp is a simple tool to assess the organization’s current implementation of Scrum (Scrum Checklist: Crisp - Get agile with Crisp, n.d.). The checklist has been translated into 19 different languages and is used by Scrum trainers around the world. As Kniberg (2010) stated, the checklist is not “rules” but “guidelines” for the team to go through at a retrospective as a discussion tool rather than an evaluation. Items (team activities) to be checked are categorized under five sections with a guideline under each section as below:

- (1) The bottom line – “If you achieve these you can ignore the rest of the checklist. Your Process is fine.”
- (2) Core Scrum – “These are central to Scrum. Without these you probably shouldn’t call it Scrum.”
- (3) Recommended but not always necessary – “Most of these will usually be needed, but not always all of them. Experiment!”
- (4) Scaling – “These are pretty fundamental to any Scrum scaling effort.”
- (5) Positive indicators – “Leading indicators of a good Scrum implementation” (Kniberg, 2010, p.1).

Eliassen Group (2013) initially developed Enterprise Agility Maturity Matrix. The tool is a spreadsheet with a section for describing the organization as a whole and another section which is for describing individual teams. There are a number of Agile indicators for each section and each indicator ranges from a ‘0’ (impeded) to a ‘4’ (ideal). For each cell in the matrix, there is a simple English explanation of what it means to be at that level for that indicator. The goal is to get as many indicators to a ‘2’ (sustainable) as possible. This helps the organization understand when they are over the main hump of adoption so that they don’t stop investing in the adoption too early. If there are not enough indicators get to the sustainable level, the organization will likely backslide to its old ways (p.1).

Signet Research & Consulting (2019) developed a questionnaire to begin the reflection process at the organization or team level. Their process separates the functions of leading, learning and executing and assumes the organization is in stable condition and ready to change as modeled after the Action Review Cycle which was also introduced by the consultant firm for use in military settings and later transferred to business (p.1).

Linders (2019a) developed the Agile Self-Assessment Game for teams and organizations to self-assess their agility. The card game consists of 52 cards with statements on applying agile practices. The card texts are based on the manifesto for agile software development and generally accepted agile principles and practices. With this card game, teams discover how agile they are and what they can do to increase their agility to deliver more value to their customers and stakeholders. The game’s webpage also lists more than 80 tools and checklists for agile self-assessment. Linders (n.d.) recommends that teams ask themselves the following 3 questions before they take further actions to increase the agility: (1) How Agile and Lean are you already? (2) Where do you want to become more Agile and Lean? And why? (3) What can you do to make the next step?

Cape Project Management, Inc. (n.d.) provides an Agile Maturity Assessment to assess organization's Agile maturity. Participants will receive a weighted total score that will be aligned with an overall Agile Maturity Model after completion of the 60-question online questionnaire. The score indicates different levels of Agility (see Table 1). According to Dan Tousignant, owner of Cape Project Management, “no maturity model is perfect, but ours should provide insight into where you are today, reinforce where you have come from, and give you an idea where you are going” (Tousignant, n.d.).

Table 1. Agile Maturity Model by Cape Project Management, Inc.

Agile Maturity Assessment Score	Level of Agility
0 – 80 points	Ad-hoc Agile
81-160 points	Doing Agile
161-240 points	Being Agile
241 - 320 points	Thinking Agile
> 320 points	Culturally Agile

KSTS Consulting (n.d.) stated that properly identified and carefully monitored agile maturity metrics (AMMs) could be an effective “lever” to steer an organization towards success in agile transformation. They suggested ten questions to be answered before using metrics to identify and collect metrics to in an assessment. They thought that metrics can be collected and be indicative of conditions at different organizational levels (p.1).

While helping teams implement agile principles and assessing agile, experts have noticed that agile approaches don’t always achieve what people expect. Organizational leaders are complaining that they’re not

getting the benefits they expected. Shore & Larsen (2018) observed that agile teams pass through four distinct zones in the learning process – Focusing, Delivering, Optimizing, and Strengthening. Each zone brings specific benefits and depends on a set of agile proficiencies which are observable behaviors that leads to the zone’s benefits. Shore & Larsen (2018) formalized The Agile Fluency Model (see Fig.5) focusing on fluent proficiency - “a habit of exhibiting the proficiency at all times, even when under pressure. Anyone can follow a set of techniques when given time to focus in a classroom; true fluency is skillful, routine ease that persists when your mind is distracted with other things.” It takes time and investments for teams to get the benefits from each of the four distinct zones. Teams also need to learn specific skills in each of the four distinct zones as shown in Fig.5.

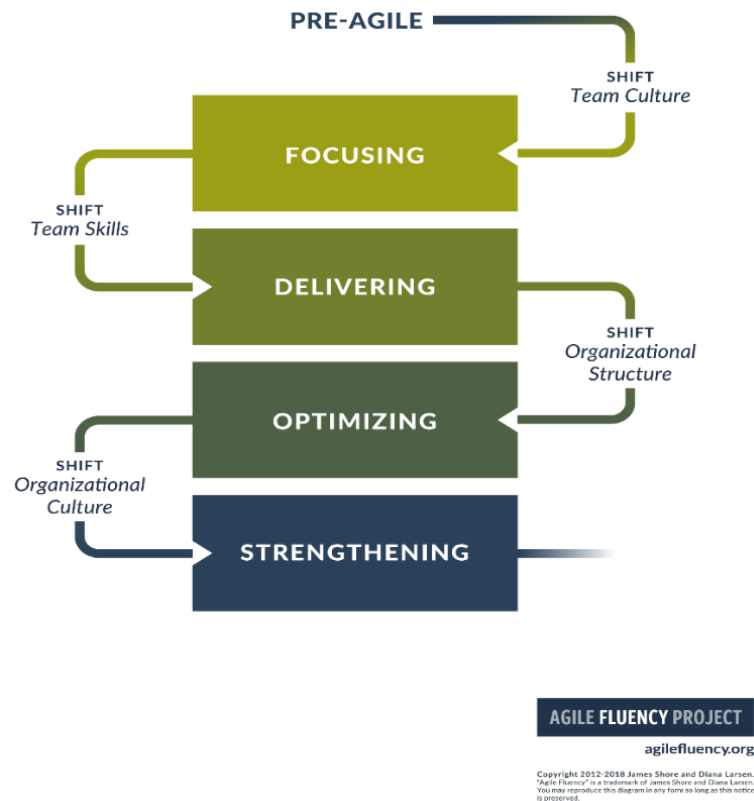


Figure 5. Agile Fluency Model by Shore & Larsen (2018)

The above tools are just a few example agile assessments which are applied in industries through software development to general management. While we are reviewing agile in the above aspects in various organizations and turning our attention to the higher education industry, the questions is, whether higher education management teams have adopted agile mindset, practices or tools. Higher Education institutions must be able to determine employers’ workforce expectations to satisfy the constantly changing needs of business (Liao, Kilcoyne, Hardy & Parker, 2018). In the next section we will discuss the agile transition in the higher education industry. Higher education institutions should have agile management practices to facilitate the innovation to create the next generation of business leaders.

V. AGILE PRACTICES IN HIGHER EDUCATION WORLDWIDE

Denning (2015a) stated that “the drivers of these dramatic changes in performance of 21st Century organizations is radically different mindset of the leaders, managers and staff of the organization. These people view, and think about, and interact with, the world very differently” (p.1). It is imperative that higher education adapt quickly to the changes of business and become more efficient to meet the expectations of the students, employers and other stakeholders. As companies in other industries are embracing agile to cope with complexity, uncertainty and fast changes in the business market, higher education institutions are in the same situation. To prepare graduates to enter the 21st century business environment, higher education institutions have realized global learning is now an essential part of the knowledge and skill sets needed by business graduates (Liao et al., 2019). Higher education institutions worldwide are making changes in the aspects of educational settings,

instruction means, teaching methods, international exposures and culture to be agile to satisfy the more customized learning demand of the students (Liao et al, 2019). It would appear that they are implementing the agile process but there is little evidence of the actual process. The following paragraphs will describe the changes made in the higher education arena by the United States, Europe and Asia.

5.1 The United States

Institutions of higher education are identified by the North American Industry Classification system. This change has been documented in North American Industry Classification System (NAICS) under Code 611310 – “Colleges, Universities, and Professional Schools”. In 1997 NAICS, Code 611310 was defined as “comprised establishments primarily engaged in furnishing academic courses and granting degrees at baccalaureate or graduate levels. The requirement for admission is at least a high school diploma or equivalent general academic training” (United States Census Bureau, 1997). NAICS has been revised three times in the 21st century in the year of 2002, 2012 and 2017. Code 611310 got revised in 2002 adding a description of “diverse settings” such as “the establishment's or client's training facilities, educational institutions, the workplace, or the home” and “through correspondence, television, Internet, or other means”, then further revised in 2017 adding more details of “diverse means” and “methods”. Instruction may be provided in diverse settings, such as the establishment's or client's training facilities, educational institutions, the workplace, or the home, and through diverse means, such as correspondence, television, the Internet, or other electronic and distance-learning methods. The training provided by these establishments may include the use of simulators and simulation methods.” (United States Census Bureau, 2017).

In response to the customers of higher education, changes in delivery modes are in use in classrooms today. Classroom instruction in higher education has also changed to a more agile method as a larger percentage of classes are offered online for the convenience of working students. Today's classrooms include focused teams working together to review case studies relating to current events which allows them to adapt quickly to the changing needs of industry. This allows students to unleash creativity, adapt through fast learning cycles, and iterate towards success. Education and industry are working together to ensure that skills taught in the classroom are transferrable to the workforce. “

The emergence of Virtual Colleges/Universities (VCUs) in the United States is an evidence of the above change. The trigger event sparking the creation of VCUs was the establishment of the Western Governors University (WGU) in 1996. By the year 2000, almost every state in the nation had created some initiative or entity resembling a VCU (Epper, R, Garn, M. 2004, p.2). In a VCU study for which surveys were sent to 61 VCUs within a single system or state, Epper & Garn (2004) found, “Though still among the highest priorities, providing access and serving the underserved—the traditional goals of distance education—have declined slightly in importance. The goals with the largest increases in importance are those related to higher education efficiency: increasing communication and collaboration; developing new courses and programs; leading in new learning technologies; and reducing costs. Seeing nearly as large an increase are goals that emphasize meeting state workforce and economic needs, such as creating a better-educated workforce and increasing economic development” (Epper, R., Garn, M, 2004, p.2).

5.2 Europe

In Europe, the mindset of agile in education leaders can be traced to the “Bologna Declaration” which was signed in June 19, 1999 by the European Ministers of Education from some 30 countries. Bologna Declaration appreciated that European higher education institutions had “accepted the challenge and taken up a main role in constructing the European area of higher education” because this was of the highest importance to ensure “higher education and research systems continuously adapt to changing needs, society's demands and advances in scientific knowledge” (European Ministers in charge of Higher Education, 1999).

In order to increase the international competitiveness of the European system of higher education, Bologna Declaration objectives include “adoption of a system of easily readable and comparable degrees in order to promote European citizens employability and the international competitiveness” (Wende, 2000, p.3). Another element of the objectives is the establishment of a system to promote mobility for students to acquire credits even in non-higher education contexts, including lifelong learning, provided they are recognized by receiving universities concerned. Primarily, Bologna Declaration objectives were established to overcome obstacles for students accessing to study and training opportunities and related service, and for teachers, researchers and administrative staff researching, teaching and training in a European context without prejudicing their statutory rights (European Ministers in charge of Higher Education, 1999).

The Bologna Declaration initiated a radical change within higher European education institutions. This change triggered the creation of new administrative procedures in the everyday life of European universities. It

also gave rise to the emergence of new concepts for the description of curricula (Demartini, G. Enchev, I., Gapany, J., & Cudre-Maroux, P., 2013, p.5). It also brought institutional changes which challenged the tradition. One example is Finland. In Finland the education reforms were undertaken with legislation changes to incorporate Bologna goals into higher education. The reforms emphasized competitiveness, efficiency and accountability which contested the Nordic welfare state value of equality to build a more effective higher education system, integrate fragmented higher education and research activities, strengthen top-level and priority areas, and enhance the internationalization of higher education (Ursin, 2019, p.67).

5.3 Asia

Universities in Asia are also becoming agile through providing students flexibility, experiential learning and international exposure in degree programs and curriculums. Examples of these universities include:

- (1) Hong Kong University of Science and Technology (HKUST). In HKUST Business School, the undergraduate curriculum focuses on broad-based learning with a flexible structure where students acquire multidisciplinary skills relevant to the business environment. Over 80% of business students choose to specialize in two majors. Plus, they can also take non-business minors to broaden their skills and knowledge to meet the employers' expectations once they graduate. They also have plenty of opportunities for international exposure.
- (2) National University of Singapore (NUS). NUS Business School established an academically rigorous yet flexible curriculum with diversity of global and experiential opportunities. Students are taught to possess multiple skill sets and solve new business problems, so they can excel in a challenging and demanding workforce. The school also strongly focuses on leadership and entrepreneurial education.
- (3) SP Jain School of Global Management – Dubai. The school emphasizes on real-world business skills alongside academic learning, ensuring that graduates are confident and hold the relevant expertise to compete in a global setting. Every business student is required to take up an Action Learning or Entrepreneurship Project where they work with local companies to submit consultant-level reports. Students can also participate in special global learning classes (Study International Staff, 2019)

While it appears higher education institutions worldwide have initiated agile practices, they have initiated dramatic changes, but we are unclear if they followed the agile model as described by the processes listed earlier in this paper. According to Matthew Moran, head of transformation at The Open University, "Universities are being slow to adopt agile development practices, let alone to think strategically about agile organization" (Linders, 2019b, p. 1). The generally low trust, quite political and hierarchical university culture makes it hard for anyone trying to introduce agile methods. If higher education institutions embrace agile in general management, they should expect further reforms, especially in university and school level to flatten the hierarchical organization and to build the cross-functional teams. Therefore, worldwide, higher education institutions appear to have instituted the agile process, but it is not clear that they have used the agile models as described above for other organizations.

VI. CONCLUSION

Embracing agile to focus on creating value for customers and gaining the competitive edge, leaders and practitioners in higher education must embrace the agile process. By doing so, they will become customer-centric meeting the ever-evolving demand of the complex and fast changing labor market. The journey for colleges and universities to embrace agile has just begun. Hann D (2019) proposed virtual schools, partnerships with organizations and many other educational models to enhance learning and connect higher education to the needs of the employers in 1998. For years employers have been indicating to institutions of higher education what their needs are but there appears to be a disconnect. Some of the models were adopted but many are still being discussed as change in higher education is slow. From the literature review, there are scant descriptions of agile progress in companies and higher education institutions as it is a mindset. The agile process is being used in the classroom, so the transformation process has begun though there is much more to be done. Future research should give more specific information and examples of the collaboration of higher education and industry using the agile methodology under agile mindset. Further educational reforms, especially the organizational structure reforms are still needed to be enacted. This article on agile literature review provides important academic and practice value to the future research and practices in agile management area, especially, the agile higher education management.

REFERENCES

- [1] Schwab, K. (2016, January 14). The Fourth Industrial Revolution: What it means and how to respond. Retrieved from <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>.
- [2] Agile Alliance. (n.d.). Agile 101. Retrieved from <https://www.agilealliance.org/agile101/>.
- [3] Denning, S. (2016a). What is Agile? Retrieved from <https://www.forbes.com/sites/stevedenning/2016/08/13/what-is-agile/#5d43783426e3>.
- [4] Project Management Institute. (2017). *Agile practice guide*. Newton Square, PA: Project Management Institute.
- [5] Rigby, D., Sutherland, J., and Takeuchi, H. (2016a). The Secret History of Agile Innovation. Retrieved from <https://hbr.org/2016/04/the-secret-history-of-agile-innovation>.
- [6] Cooke, J. (2012). Everything you want to know about Agile: How to get Agile results in a less-than-agile organization. IT Governance Publishing. Retrieved from <http://www.jstor.org/nsula.idm.oclc.org/stable/j.ctt5hh467.9>
- [7] Beck, K., Beedle, M., Bennekum, A. V., Cockburn, A., Cunningham, W., Fowler, M., . . . Thomas, D. (2001). Manifesto for Agile Software Development. Retrieved from <http://agilemanifesto.org/>.
- [8] Principles behind the Agile Manifesto. (n.d.). Retrieved from <http://agilemanifesto.org/principles.html>.
- [9] Denning, S. (2016b). Explaining Agile, Retrieved from <https://www.forbes.com/sites/stevedenning/2016/09/08/explaining-agile/#36e0edc6301b>
- [10] Martins, P. & Zacarias, M. (2017). An Agile Business Process Improvement Methodology. *Procedia Computer Science, Volume 121*, 129-136. Retrieved from <http://www.sciencedirect.com/science/article/pii/S1877050917322093>.
- [11] Denning, S. (2015a), October 27. Can The 21st Century Corporation Operate Without Agile? Retrieved from <https://www.forbes.com/sites/stevedenning/2015/10/23/can-the-21st-century-corporation-operate-without-agile/#330acbe71531>.
- [12] Livorsky, E. (2016). Eight Characteristics of Agile Leaders. Retrieved from <https://www.fminet.com/fmi-quarterly/article/2016/09/eight-characteristics-of-agile-leaders/>.
- [13] Cooke, J. (2010). *Agile Principles Unleashed: Proven approaches for achieving real productivity gains in any organization*. IT Governance Publishing. Retrieved from <http://www.jstor.org/nsula.idm.oclc.org/stable/j.ctt5hh6tt>.
- [14] Stevenson, William J., (2018). *Operations management* (13th edition, pp. 26 & 657). New York, NY: McGraw-Hill Education.
- [15] Rigby, D., Sutherland, J., and Takeuchi, H. (2016b). Embracing Agile. *Harvard Business Review, May 2016 Issue*. Retrieved from <https://hbr.org/2016/05/embracing-agile>.
- [16] Denning, S. (2015b, October 31). Surprise: Microsoft Is Agile. Retrieved from <https://www.forbes.com/sites/stevedenning/2015/10/27/surprise-microsoft-is-agile/#70e2c83e2867>.
- [17] Scrum Checklist: Crisp - Get agile with Crisp. (n.d.). Retrieved July 3, 2019 from <https://www.crisp.se/gratis-material-och-guider/scrum-checklist>.
- [18] Kniberg, H. (2010, October 4). *The Unofficial Scrum Checklist* [PDF]. Retrieved July 3, 2019 from <https://www.dropbox.com/s/qsitv2v30olqhms/Scrum-checklist.pdf?dl=0>.
- [19] Eliassen Group. (2013, November 12). Introducing the Enterprise Agility Maturity Matrix. Retrieved from <http://blog.eliassen.com/introducing-the-enterprise-agility-maturity-matrix>.
- [20] Signet Research and Consulting. (2009). A quick self-assessment of your organization's agility. Retrieved June 24, 2019 from http://www.signetconsulting.com/action_items/assessment.php.
- [21] Linders, B. (2019a). *The agile self-assessment game: An agile coaching tool for improving the agility of your teams and organization*. Tilburg: Ben Linders Publishing.
- [22] Linders, B. (n.d.). Agile Self-assessments. Retrieved from <https://www.benlinders.com/tools/agile-self-assessments/>.
- [23] Tousignant, D. (n.d.). How Agile are you? Free Agile Maturity Assessment. Retrieved from <https://capeprojectmanagement.com/agile-self-assessment/>.
- [24] KSTS Consulting. (n.d.). Agile (Re)Assessment. Retrieved from <http://www.keystepstosuccess.com/agile-assessment/>.
- [25] Shore, J., & Larsen, D. (2018, March 6). The Agile Fluency Model. Retrieved July 3, 2019, from <https://martinfowler.com/articles/agileFluency.html>.
- [26] Denning, S. (2017). The next frontier for Agile: strategic management. *Strategy & Leadership*, 45(2), pp.12-18. Retrieved from <https://doi.org/10.1108/SL-02-2017-0021>.
- [27] Liao, W., Kilcoyne, M. S., Hardy, M. M. and Parker, C. (2018). Does our course content meet the employers' needs? An exploratory study specifically related to international business in Louisiana.

- International Journal of Business, Management and Social Research*, 04(02), 229-239. Crossref: <https://doi.org/10.18801/ijbmsr.040218.26>.
- [28] Liao, W., Kilcoyne, M. S., Parker, C., Perez-Mira, B., Jones, C., & Woods, L. (2019). Engaging students globally without leaving the comforts of home. *Journal of Global Education and Research*, 3(1), 22-36. doi:10.5038/2577-509X.3.1.1073.
- [29] United States Census Bureau. (1997). North American Industry Classification System: 1997 NAICS. Retrieved from https://www.census.gov/eos/www/naics/reference_files_tools/1997/sec61.htm.
- [30] United States Census Bureau. (2017). North American Industry Classification System: 2017 NAICS Definition. Retrieved from [https://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=611310&search=2017 NAICS Search](https://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=611310&search=2017%20NAICS%20Search).
- [31] Epper, R., & Garn, M. (2004, January 1). Virtual Universities: Real Possibilities. Retrieved from <https://er.educause.edu/articles/2004/1/virtual-universities-real-possibilities>.
- [32] European Ministers in charge of Higher Education. (1999, June 19). The Bologna Declaration of 19 June 1999: Joint declaration of the European Ministers of Education. Retrieved July 3, 2019, from https://www.eurashe.eu/library/bologna_1999_bologna-declaration-pdf/.
- [33] Wende, Marijk van der. (2000). The Bologna Declaration: Enhancing the Transparency and Competitiveness of European Higher Education. *Journal of Studies in International Education, Fall 2000 Issue*. Retrieved from <https://journals-sagepub-com.nsula.idm.oclc.org/doi/pdf/10.1177/102831530000400202>.
- [34] Demartini, G., Enchev, I., Gapany, J. & Cudré-Mauroux, P. (2013). The Bowlogna ontology: Fostering open curricula and agile knowledge bases for Europe's higher education landscape, *Semantic Web*, 4(1), 53-63.
- [35] Ursin, J. (2019). Higher Education Reforms in Finland: From a Ponderous to a More Agile System? In Broucker, B., Wit, K.D., Verhoeven, J. C., & Leišytė, L. (Eds.), *Higher Education System Reform: An International Comparison after Twenty Years of Bologna* (pp. 67- 77). Leiden: Brill Sense. doi:10.1163/9789004400115_005.
- [36] Study International Staff, April 26, 2019, Leading undergraduate degrees that spark agile business talent. Retrieved from <https://www.studyinternational.com/news/leading-undergraduate-degrees-that-spark-agile-business-talent/>.
- [37] Linders, B. (2019b, Mar. 21). Agile in Higher Education: Experiences from The Open University. Retrieved on June 26, 2019 from <https://www.infoq.com/news/2019/03/agile-higher-education/>.
- [38] Hanna, D. (2019). Higher Education in an Era of Digital Competition: Emerging Organizational Models. *Online Learning*, 2(1). doi: <http://dx.doi.org/10.24059/olj.v2i1.1930>.

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