Digital badge adoption: earner's perceived educational value

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Digital badge adoption: Earner’s perceived educational value

by

Sandra Jean Schwarz

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Curriculum and Instructional Technology

Program of Study Committee:
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Iowa State University
Ames, Iowa
2016

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DEDICATION

I would like to dedicate this thesis to my family and friends who without their support and understanding I would not have been able to complete this work. I’d especially like to thank my mom and dad. They have silently inspired and encouraged me more than they’ll ever know. I would not be the person I am today without the examples they set for me growing up.
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Dr. Ana-Paula Correia, thank you for your mentorship and inspiring me to pursue my Masters degree. I truly appreciated your guidance and vast knowledge as you gently guided me through the challenges and obstacles of my journey. You have been instrumental to my success.
ABSTRACT

Digital badges are simple tools that have the potential to change the current system of credentialing, creating methods to recognize diverse learning pathways and offer opportunities for both learners and the institutions or entities that offer them. The digital badge movement is still very new, yet is growing as a method to document and communicate what an individual knows or can do. Digital badges highlight skills of the earner, who then displays the badge for someone to view, and can validate anything from mastering a skill to completion of a certain course or documenting the acquirement of a special professional experience. Digital badges have high potential to drive growth for entities that sell education as they have powerful visual potential through the badge itself and that they be displayed across multiple digital sites to large audiences such as LinkedIn.

An earner’s motivation to participate in courses that offer digital badges and display the badge earned can drive growth for entities offering those courses or events. Current formal knowledge and skill achievement programs with recognition for degrees via a paper certificate exists through colleges, universities and some type of job related programs for those outside of school such as a Professional Project Manager certification. The output of these offerings is to get a diploma or certificate which can be displayed in a frame and/or with a line item on a resume recognizing the achievement. So if the earner valued these certificates, they either place the certificate in a frame or display it for all to see; they would add the certification as line item to their resume to share with potential employers; or if applicable, so note them on some other type of shareable medium such as a business card. This is true as well for many companies, businesses or formal certification programs outside of the official education model. Due to the growth of technology, the Internet, social media and portable electronic devices that are with
people 24 hours a day, 7 days a week and 365 days a year, people are learning and sharing
information about themselves in many different ways.

As technology evolves so do the uses. There is a need for recognition of skill and
knowledge achievements beyond public, private and higher education. Due to technology
advancements, digital badges are a method of recognizing the knowledge and skills a learner
currently has or acquires above and beyond formal institutionalized education and outside of a
paper-based attendance or certificate completion. Because digital badges are still fairly new, it is
important to research the awareness, value, and perceived benefits of digital badges by the earner
as they are the ones who will seek to attain and ultimately display them. This will in turn guide
the development of programs with digital badges through their areas of interest and create critical
mass for those programs offering them.

There are three parties engaged in the transaction of a digital badge: earner, this is the
person who can earn and choose to display the digital badge; issuer, this the person who has tied
all the credentials to the badge and offers it to the earner; and observer, this is the person who
looks at the badge displayed or offered digitally by the earner. The purpose of this study is to
understand the earner’s awareness of digital badges, their interest in digital badges and the
courses that offer them, and the perceived value of a digital badge and courses that offer digital
badges.

The current study included one hundred twelve (112) participants completing an initial
online survey that gathered characteristics of the learner and ratings on their knowledge
awareness, perceived value of digital badges and of courses with digital badges, perceived value
of displaying a digital badge and the type of badges they would be interested to earn. A follow-
up survey was then conducted furthering the initial survey to better understand the value an
earner placed on a course with a digital badge and what are the biggest concerns or curiosities of digital badges.

The results of the study showed that the earner who is one third of a badge transaction, with the issuer and observer making up the other two-thirds, is interested in digital badges and educational courses that offer them, do see them as valuable to have, display and earn, and do find educational courses that offer them as valuable.
CHAPTER 1 INTRODUCTION

A digital badge is a new way to capture and communicate what an individual knows and can demonstrate (Finkelstein, Knight, & Manning, 2013). With technology leading the way, the methods for presenting content to a learner has evolved out of the classroom with an instructor to learning anytime, anywhere with any technological device. In 2011, Secretary Ann Duncan remarked at the 4th Annual Launch of the MacArthur Foundation Digital Media and Lifelong Learning Competition,

“Badges can help engage students in learning, and broaden the avenues for learners of all ages to acquire and demonstrate – as well as document and display – their skills. Badges can help speed the shift from credentials that simply measure seat time, to ones that more accurately measure competency. We must accelerate that transition. And, badges can help account for formal and informal learning in a variety of settings” (2011).

Digital badges are an attractive and rapidly a popular trend because they serve all three parties to a badge transaction: the earner, issuer, and observer. Digital badges are a portable way to recognize achievement; any organization, application, or platform can easily issue and display them. Organizations that issue digital badges increase their potential impact by reaching new audiences and providing learning opportunities that can be recognized (Finkelstein et al., 2013). It is highly probable that there will continue to be growth in the popularity of digital badges due to the benefits of reaching a growing number of learners who want to be recognized for their knowledge and skills and it connects credentials to validate the achievement. This research study helps to establish the earners awareness, interest, perceived value and the types of digital
badges interested to earn. The ultimate goals is to determine if the earner finds interest and value in digital badges and would seek opportunities to attain and in the end display them.

Current formal knowledge and skill achievement programs with recognition for achievement exist through colleges, universities or some type of job related program for working adults. The output of these offerings is to get a diploma or certificate that can be recognized and displayed in a frame and/or with a line item recognizing the achievement on a resume or business card. Instructor-led courses within businesses recognize achievement much the same way. The traditional way for those in the workforce to highlight their skills for potential employers is by showing them academic degrees, certifications, continuing professional education certificates, or other paper documents (Stone, 2015). Due to the growth of the technology including the Internet, social media sites and devices that are with people 24 hours a day, 7 days a week and 365 days a year, people have access to information that applies to personal and professional life, and are learning marketable skills in multiple ways in and outside formal or work-related courses.

Adults, who are outside of formal education, need a way to capture and communicate the knowledge and skills they currently have or attained through life-experiences, on-the-job training, informal or formal learning, that goes beyond a paper certificate. They need a way to capture, communicate and enable validation of their knowledge/skills. Training and development programs for adult learners do exist outside of formal college or university programs, within the company the adult learner is employed by, and/or through product, system or software suppliers to that company. Learners may choose to pursue these programs; and if they do, they will want to be recognized for one or more reasons such as attendance, successful completion, specific knowledge or skill acquired, or to acquire a promotion and/or different job.
Digital badges are much more than paper certificates to hang on an office wall or mention in your resume. Digital badges are tokens that show your achievements (Stone, 2015). They are a method of digitally recognizing the knowledge and skills a learner has or acquires above and beyond formal institutionalized education that goes beyond receiving a paper certificate. Digital badges can be of particular value to an adult learner as they have the ability to capture knowledge and skills that may have been attained through life or job related experiences that are valuable in a workplace. This is true mostly because the digital badge carries the credentials of what was done to earn the badge and can be validated by the person observing the badge. The anatomy of a digital badge or an open badge contains the following: badge name, description, criteria, issuer, evidence, date issued, standards and tags (Parker, n.d.).

Digital badges are still fairly new in the industry and have not reached their tipping point. Gladwell (2005) describes the tipping point as that magic moment when an idea, trend, or social behavior crosses a threshold, tips and spreads like wildfire. It is important to research the value digital badges have to the earner to understand their awareness, interest, perceived value and willingness to display them in order to develop a valuable digital badge program that will drive earner motivation for attainment and participation.

A badge is a distinctive emblem worn as a mark of office, membership, achievement, licensed employment and so on (Merriam-Webster, 2003). Digital badges are electronically enabled and offer a way to validate credentials. A digital badge is an online visual representation of an accomplishment that can be viewed online such as from a website or from a digital resume. It may or may not have credentials that validate what and how the person earned it. A digital badge is a credential that represents an individual’s skills, interests, and achievements (Alliance for Excellent Education, 2013).
Many people are familiar with badges as they relate to achievement in the military or the Boy and Girl Scouts. The badges in these entities represent a visual symbol of knowledge or a skill attained, such as heroism or knot tying; and it is displayed as symbol of that achievement on the sash worn with a uniform or the uniform itself. Regardless of the branch of service or Boy or Girl Scout troupe a person is in, the specific badge is earned the same way. Others who are in or outside of the military or Scout troupe can immediately recognize the value of the badge regardless of where they live or what they do. For Boy and Girl Scouts, the badge is transportable from troupe to troupe as it stays with the earner and is recognized by all troupes.

Scoutcraft is a term first used in 1908 to define the craft, skill, or practice of a Scout (Merriam-Webster, 2016). Merit badges in Scouting offer the opportunity to learn skills, introduce possible lifetime hobbies, or inspire a career to pursue. The Scout badge provides the recognition of achievement and motivates the desire for continual advancement of Scout programs (Boy Scouts of America, 2015). This Scoutcraft knowledge and skills are notable as they are lifelong skills. Fast forward one hundred years from when the original 57 Boy Scout badges came out, and there is now the technology to allow digital badges to be developed with the credentials of the digital badge associated, the ability for someone to display it socially, and opportunity for people to observe them.

Boy Scouts have over 100 badges that can be earned. The types of badges offer have ebbed and grown over time based upon popularity and interest. While Scouts can select the badges they would be interested in earning, the motivation to earn a badge is that once it is earned, it can be displayed and opportunity for a higher level badge (Eagle Scout) can be attained.
1.1 Purpose of the Study and Research Questions

The purpose of the study is to evaluate the awareness, interest to attain then display, perceived educational value of digital badges and of courses that offer them, by learners who attended training at a large manufacturing company. Learners in the context of the manufacturing facility are considered customers and do have a choice on what training they want to attend and where they to attend it. These learners provide the support in companies through roles such as being technicians or engineers. They are responsible to plant operation, maintenance and trouble-shooting for repairs.

Since digital badges are still relatively new, it is important to first understand if the audience is aware of digital badges. And, in order to develop digital badges for adult learners who pay for and take courses that may contain them, it is important to understand if customers who are taking the courses value and recognize the benefits of digital badges; and it is important to understand the types of digital badges they would be interested in earning. The research further expands on this base information to understand if the learner would recommend a course that had a digital badge, if they could pick an equitable course with a digital badge over one without, and what are the biggest concerns and/or curiosities of digital badges. For the purpose of this study, learners who are potential earners of digital badges will be surveyed to determine the following:

1. Level of awareness, interest, and value learners have for digital badges;
2. The educational value for courses with digital badges; and
3. Their willingness to seek out and display digital badges.

The answers to these questions are the basis of understanding value, discernment of perceived value of courses with or without digital badges, and interest level to attain the digital badge. For context of this study, it’s important to understand what is meant by earner awareness,
interest, and value. First, awareness is about their knowledge level or understanding of digital badges, how they work. Awareness may come from having earned one themselves, knowing someone who has earned one or having read about them. Next, interest is about their curiosity level or how appealing they are to the earner. Interest may be driven from wanting to know how they work, having concerns on how they work and understanding how they might be of value. Last, value is about the significance of digital badges, their worth, or the importance of them. The value proposition is not only what the earner perceives for the digital badge itself but also the educational value by taking a course that offers them.

The research would provide data to facilitate further examination of the student’s perception of instructors with and without digital badges in the topics of interest to the students in order to understand the impact of instructors having or not have the digital badge the student desires to attain. An instructor with a digital badge may be perceived motivation by the learner to earn the digital badge from someone who has gone before them and displays it.

The following are terms are addressed initially to guide understanding of the study’s content. Additional terms are addressed in closer proximity to the context of where used in the content.

1. Atari: A multi-platform, global interactive entertainment and licensing company. The original innovator of video gaming, founded in 1972, Atari owns and/or manages a portfolio of more than 200 games and franchises, including world renowned brands (Atari, 2012).

2. Boy Scouts: The Boy Scouts of America is one of the nation’s largest and most prominent values-based youth development organizations. The BSA provides a program for young people that builds character, trains them in the responsibilities of
participating citizenship, and develops personal fitness. (Boy Scouts of America, 2016).

3. Digital Badge: In a broad sense, digital badges are online records of a person’s knowledge, skills, achievements and abilities represented through the use of technology via a website on an electronic resume. They can be represented visually as recognizable online icons that contain meta-data detailing criteria and competencies earned by the learner, as well as badge information, skill/knowledge, date of issue, date of expiration and identity of issuer. They provide easily accessible digital validity of the information credentialed by the digital badge.


5. Gamerscore: A points system used on the Xbox 360. Often abbreviated as just 'G'. Every Xbox 360 game has "achievements" and when you unlock these achievements you will get a certain amount of Gamerscore (GOWking, 2007).


7. LinkedIn: Founded in 2003, LinkedIn connects the world's professionals to make them more productive and successful. With more than 400 million members worldwide, including executives from every Fortune 500 company, LinkedIn is the world's largest professional network on the Internet (LinkedIn, 2016)

8. lynda.com: An online learning company that helps anyone learns about business, software, technology and creative skills to achieve personal and professional goals. Through individual, corporate, academic and government subscriptions, members have access to the lynda.com video library of engaging, top-quality courses taught by recognized industry experts. (Lynda.com about Page, 2016).

10. Mozilla Foundation: The nonprofit Mozilla Foundation is the organizational home of the Mozilla Project, a global community and public interest initiative that believes the Web should be open and accessible to all. To protect the Web as a public resource and empower its users, we create open source products, teach 21st-century skills and spur grassroots advocacy campaigns. All this is made possible by full-time staff and thousands of volunteers around the world. (Mozilla, 1998-2016).

11. Open Badges: Digital badge with digital credentials connected.

12. Xbox: A video gaming brand created and owned by Microsoft (Xbox, 2016).
1.2 Significance of the Study

Digital badges are still relatively new, and there are many opportunities and potential for using them to recognize an achievement for adult learners. Yet, there is needed discovery into the perceived value and benefits of digital badges along with the types of badges a target audience who may be interested to earn them. Because adult learners are autonomous and self-directed learners they seek to learn for multiple reasons, which include achievement recognizing them for promotions or other career experiences.

According to Zomick (2013), if you have spent time earning a volume of digital badges and certificates, the million dollar question is – are they worth anything? The skills that you are learning via these platforms are hard skills that can help you get employed. Digital certificates and badges are relatively new so there is very little in the way of official evidence to prove or disprove their worth. However, it is of value to better understand the potential digital nature of the icon badge to education beyond what is meant by them in programs such as Boy Scouts Merit Badges or in the gaming world of systems such as Xbox.

Traditional recognition for learning, such as a diploma, is being questioned. Employers are not seeing the skills they need represented in the diploma, and more importantly the student. The quest for reinventing credits aims at decreasing this gap by allowing students to earn digital badges, micro degrees, nanodegrees, certificates and a host of other forms of micro credentials (Lowendahl & Thayer, 2016). The digital badge has the potential to go beyond the current assumed paper certificate with high potential to be given in addition to it and ultimately disrupt the traditional model by replacing it completely.

Like certificates, digital badges need to be valued. Understanding the value of digital badges and the power that they hold over a paper certificate is important to drive the understanding for value of digital badges to not only the earner, but also the issuer and observer.
Even with certificates or certifications there is confusion. According to Blache (2016), people use the terms certification and certificate interchangeably. Certification refers to confirming competency in knowledge and/or skill. A certificate is a non-diploma document that is issued after completing training. This confusion contributes to current digital badging practices of receiving a digital badge for attendance. This appears to not have much value unless the earner is trying to demonstrate they have attended a particular conference for the past ten years, as an example.

Perception on value and interest precedes an effort to build, to market and to communicate digital badges. “If you build it, he will come” (Universal Studios and Phil Alden Robinson, 1989). Just because a digital badge is created, does not mean that potential earners will seek and display it. It is important to understand why a learner perceives that a digital badge has value, why a learner would choose to take a course with a digital badge over a course without, or visa-versa, and what type of digital badges would be of interest to earn. Just because digital badges can be built, does not mean learners will flock to them. Understanding what is of value or interest and why, all comes before the effort to be undertaken to develop a digital badge system. The research helps to guide plan development prior to building.

We have five generations in the workforce with varying degrees of education. With each age level, education and job competence has taken varied paths. In the examination of results the characteristics will be examined including: gender (male or female); age (Pre 1946, Traditionalist; 1946-1964, Baby Boomer, 1965-1976, Gen X; 1977-1997, Millennial; and after 1995, Gen 2020); and education level (Some high school, no diploma; High School Graduate, diploma or GED; some College, no degree; Trade, Technical and/or Vocational School; Associate Degree; Bachelor Degree; Master Science/Arts; and Doctorate). This will be
important to understand if there are differences based upon these characteristics and if possible why as this in turn may contribute to the design and development of a digital badge program.

Merit badges have been an integral part of the Scouting program, and are an important part of the uniform for Boy Scouts. Scouting came to the United States in 1910. Since then the Boy Scouts of America (BSA) have offered hundreds of merit badges.

Unlike fabric emblems offered through the Boy Scout program, digital badges rely on technology to communicate that they have been earned. The information in this study will help further the development of digital badges as likely outcomes for tracking and validation for formal and professional programs. It will assist in providing clarity of what and why digital badges are attractive to learners in the workplace or learners seeking to be in a specific career to take courses from companies that offer the badges when they have multiple businesses extending courses, with or without digital badges, to choose from.

1.2.1 How Present Study Extends Literature

While the ecosystem of badges consists of the earner, issuer and observer with each extracting similar and different benefits to a digital badge system; little is known regarding the usefulness of digital badges and the acceptability of the digital badge by the potential earner. Digital badges are still incredibly new and there are very few published studies evaluating the earner’s awareness, interest level and perception of value for digital badges. There is a need to understand the learner’s motivation to participate in courses that offer digital badges and the entities offering them. If an earner does not find merit in exercising effort to achieve a digital badge, display it, or communicate its value to others, then it may not matter how good the badge system is that has been created by the issuer, who offers it or and contributes to where it can be
displayed, because the earner would not exercise effort to achieve it. Thus, if the earner does not display it, then whoever are potential observers are taken out of the equation to have the opportunity to observe and thus the issuer has created something that is not being sought after or used.

This research study extends the literature by researching the perceptions of earners as it relates to digital badges because they are a new disruptive technology to paper-based certificates. While the research is segmented to a population of learners within a manufacturing community, its population can be a strong correlation to other types of companies or entities. The learners can potentially consist of people with a limited education, such as those with a GED to very educated people, those with a Doctorate; and Traditionalist born 1945 and before/Baby Boomers born 1946-1965, to Gen 2020 born after 1997. This study will focus on if the learner, as a potential earner of a badge, is aware, has interest, values digital badges, values courses with digital badges and if they would display the digital badge once earned. It also evaluates if they would recommend courses with digital badges to friends or colleagues, would take a course with a digital badge over one without one, and what their biggest concern and/or curiosity would be.
CHAPTER 2 LITERATURE REVIEW

This chapter defines and discusses history of badges leading up to the present discussion and future possibilities of digital badges. The chapter starts with definition and discussion of the history of military awards. This will include information as far back as the Greeks and the value of the laurel wreath. It also will discuss the evolution of medals within America and why they were used by the armed services to bestow on the men and women of the military. This discussion will cover the governance of the medal system and what was considered to make an impactful program for the armed services. This is important to discuss due to the limited general understanding of digital badges. Additionally, it is important to understand the value of a well-defined badge model and what this means to the success of digital badge programs.

The chapter will discuss the growth of digital badges in popularity through projects facilitated through the Mozilla and MacArthur Foundation. Digital badges provide a visual symbol of an achievement and have credentials digitally attached that are verifiable. This is an evolvement from well-known cloth badges displayed by Boy Scouts or certificates put in frames recognizing achievements that a company or institution may offer. Digital badges are on a path to be an effective type of recognition bringing value to the earner who values and wants to display them, and potential growth for the entities that plan and build them right.

The chapter will review the impact made to motivation, participation and recognition. This chapter also provides research as to what drives motivation and participation in learning events for learners and what practices of recognition drive growth in attendance and participation. This will include review of theories of motivation, participation and recognition. Badges, as proved in Scouting, have the ability to drive the need for achievement. The chapter will also address what features in digital badges align well with trends in adult education.
The chapter will expand on the history of digital badges by reviewing the impact of the gaming world using digital badges as recognition for achievements in online games offered by Atari and Xbox. It will discuss the transfer of gaming motivation to achieve badges. Using badges in gamified environments motivates learners by creating highly engaging, skill related, and successive sets of learning tasks (Dicheva, Dichev, Agre & Angelova, 2015). Establishment of digital badges as a form of achievement through learning, motivation to attain them, and desire to display them by learners, will be discussed.

This chapter will also review motivation, recognition and drive for participation by characteristics of the learner and looking at gender and age. Digital badges serve multiple parties with a badge transaction. The earner is served by attaining and displaying the digital badge; the issuer is served by the earner displaying the badge earned from them; and the observer is served through finding earners that are displaying the digital badge achieved. While all play a part in the process, the issuer and observer are both served through the earner displaying the digital badge. If motivation by the earner does not exist to attain then display a digital badge, the effort may be for not for the issuer. It will also review the value of the badge specifically for the earner as specific age groups have grown up with technology.

This chapter will define and discuss the three key groups that drive perception of digital badge value: earner, issuer and observer. The evolution of mobile device technology – smartphones and tablets - and the applications that fueled them saturated the market. Is there any wonder that badges are a growing trend? The United States Secretary of Education, Arne Duncan, called badging “a game-changing strategy” and offered a $25,000 prize for the best badge concept serving veterans seeking skilled jobs (Waters, 2013). The earner is a key
component of the groups that drive perception of digital badge value because if they do not want
to earn and display badges, the efforts to create them are irrelevant.

Last, this chapter will review criticism and skepticism of digital badge programs. There
is still more to learn about the design and development of digital badge programs and how they
are perceived by the earner and what motivates them to earn a digital badge. Exploring some of
the criticism and skepticism of current digital badges will help to mitigate mistakes in developing
these offerings.

2.1 History of Military Awards

The history of military awards dates as far back to the Greeks, who crowned citizens who
were outstanding in war, athletics, literature and oratory with the laurel wreath (Wright, 2014).
Today the laurel wreath is still highly recognizable and part of America’s highest award for
valor. A resolution of the Continental Congress approved on March 25, 1776, gave the first
medal to General George Washington. In the first winter of the Civil War, a feeling developed
that a way must be found to recognize and honor the heroism and valor of American soldiers
who had distinguished them on the battlefield. A Navy and Marine Corps medal was approved
by President Abraham Lincoln on December 21, 1861, and on July 12, 1862, a Medal of Honor
was provided to award enlisted men of the Army who distinguished themselves through gallantry
in action, and other soldier-like qualities (Wright, 2014).

The reflective quality of understanding the history of badges is centered on the feeling of
receiving the medal by the men and women who earned them. In order to accomplish this, a
reputable program of medals offered as awards needed to be established. Several governing
factors went into the thought process of the medals as awards.
First, they were considered a powerful stimulus to pride of service and a method to encourage heroism or achievement. Second, in order to make them of value, they had to be given to those who truly earned them. And last, they needed to be given in a timely manner therefore appropriately recognizing the earner. The medal as visible evidence of the act or service the individual attained would then be displayed on the earner’s uniform. Back then this was one of the few ways to tie the award to the individual. Recognizing people for efforts put forward is a positive way to motivate people. Medals are one way that the armed services have been able to publicly recognize achievements. Earners displayed these medals on their military uniforms. Yet if not displayed, no one, other than the earner would know of the achievement.

2.2 Growth in Popularity of Digital Badges

Youth programs and other organizations both within and outside of traditional schooling have long used badging systems to recognize what a person knows (learning), has done (skills), or has become (role within a community). More recently, digital badges (i.e. digital images used instead of a physical badge) have been implemented for the same purposes within educational communities (e.g., Khan Academy) or social networks (e.g., Foursquare), (Randall, Harrison, West, 2013).

Digital badges provide a visual symbol of an achievement and can have credentials digitally attached that are verifiable. This is an evolution from well-known cloth badges displayed by Boy Scouts or certificates from issuing entities recognizing achievements. Digital badges are on a path to be an effective type of digital recognition bringing value to the earner who wants to display them and potential for growth for the entities that strategically plan and build them.
Over the course of 104 years of Boy Scouts, from 1912 to present, the number and type of specifically required badges has changed to earn the rank of Eagle Scout (See Table 1.1). The relevance of this information is that there is significance in understanding the needs of the audience in relation to the outcome and what the audience perceives to be of value in order to create a desired and respected program. A badging program such as with Scouting has proven to be quite successful over time, and has changed based upon the needs of the Eagle Scout program for preparedness. This has been reflected in the number and types of badges to be earned.

Table 1.1 History of required merit badges for Eagle Scouts

<table>
<thead>
<tr>
<th>Year</th>
<th>Badges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1912</td>
<td>Athletics, First Aid, Life Saving, Personal Health, Public Health [5]</td>
</tr>
<tr>
<td>1924</td>
<td>No change in list</td>
</tr>
<tr>
<td>1925</td>
<td>Athletics OR Physical Development, Bird Study, Camping, Civics, Cooking, First Aid, Life Saving, Pathfinding, Personal Health, Pioneering, Public Health, <strong>Swimming</strong> [12]</td>
</tr>
<tr>
<td>1927</td>
<td>No change except Swimming specifically listed</td>
</tr>
<tr>
<td>1928:1932</td>
<td>Athletics OR Physical Development, Bird Study, Camping, Civics, Cooking, First Aid, Life Saving, Pathfinding, Personal Health, Pioneering, Public Health, <strong>Safety</strong> [12]</td>
</tr>
<tr>
<td>1939</td>
<td>Athletics OR Physical Development, Bird Study, Camping, Civics, Cooking, First Aid, Life Saving, Pathfinding, Personal Health, Pioneering, Public Health, Safety, <strong>Swimming</strong> [13]</td>
</tr>
<tr>
<td>1941</td>
<td>Athletics OR Physical Development, Bird Study, Camping, Civics, Cooking, First Aid, Life Saving, Pathfinding, Personal Health, Pioneering, Public Health, <strong>Safety</strong>, <strong>Swimming</strong> [12]</td>
</tr>
<tr>
<td>1950</td>
<td>Athletics OR Physical Development, Bird Study, Camping, <strong>Citizenship</strong>, Civics, Cooking, First Aid, Life Saving, Pathfinding, Personal Health, Pioneering, Public Health, Safety, <strong>Swimming</strong> [13]</td>
</tr>
<tr>
<td>Year</td>
<td>List</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>1952</td>
<td>Athletics OR Physical Development, Bird Study, Camping, Citizenship, Cooking, Firemanship, First Aid, Life Saving, Nature, Pathfinding, Personal Fitness, Personal Health, Pioneering, Public Health, Safety, Swimming, one from the Outdoor Sports group, one from any of the following groups - Animal Husbandry, Plant Cultivation, Communication, Transportation, or Building, one from the Conservation group, three from the Citizenship group.[16]\</td>
</tr>
<tr>
<td>1954</td>
<td>No change in list</td>
</tr>
<tr>
<td>1959</td>
<td>Camping, Cooking, Firemanship, First Aid, Life Saving, Lifesaving (name change only), Nature, Personal Fitness, Public Health, Safety, Swimming, one from the Outdoor Sports group, one from any of the following groups - Animal Husbandry, Plant Cultivation, Communication, Transportation, Building, one from the Conservation group, three from the Citizenship group[16]\</td>
</tr>
<tr>
<td>1961</td>
<td>No change in list</td>
</tr>
<tr>
<td>1965</td>
<td>one from the Conservation group, three from the Citizenship group, Camping, Citizenship in the Community, Citizenship in the Nation, Cooking, Firemanship, First Aid, Lifesaving, Nature, Personal Fitness, Public Health, Safety, Soil and Water Conservation, Swimming, one from the Outdoor Sports group, one from any of the following groups - Animal Husbandry, Plant Cultivation, Communication, Transportation, Building, one from the Conservation group, three from the Citizenship group.[11]\</td>
</tr>
<tr>
<td>1966</td>
<td>No change in list</td>
</tr>
<tr>
<td>1989</td>
<td>No change in list</td>
</tr>
<tr>
<td>1991</td>
<td>No change in list</td>
</tr>
<tr>
<td>1993</td>
<td>No change in list</td>
</tr>
</tbody>
</table>
Badging initiatives are predicted to fulfill a growing business need for highly skilled workers by increasing educational equity in order to grow the pool of talent workers available to meet job market demands (Young, 2012). Henno, Jaakkola, and Makela (2014) point out that by 2020 over two thirds of all jobs will require post-secondary education. With the rapid rate of technological change occurring in most industries, higher education will not be able to satisfy the demand for knowledge workers with the prevailing credentialing structures (2014).

Digital badges that represent competencies attained by a learner and issued by school districts, industries and businesses, are rapidly growing in popularity and expanding with exploratory competency-based programs. The reason for growth is that badges are a symbol that shows group membership or represents community, such as wearing college sweatshirts adorned...
with the icon of one’s alma mater. They communicate hierarchy and order, such as badges that imply one’s rank in the military or an advanced degree of higher education (e.g. PhD, MA, BA, and so on). Badges also signal an unspoken understanding of the skills or knowledge that one has acquired in order to earn a given credential (Ahn, Pellicone, & Butler, 2014).

According to Alexander Halavais (2012), associate professor in Arizona State University’s School of Social and Behavioral Sciences, people are very excited about the possibility of opening up new pathways for learning, of making it possible for students coming out of high schools, but not necessarily going to college, to show competence. He goes on to say that the college career path is a very narrow one, and it is expensive. Everyone should not have to follow the same path, and digital badges have the potential to provide a system for giving credit for doing valuable, marketable things outside of school (Waters, 2013). Badging systems of all kinds help people prove what they have learned, not only in school, but also outside school with on-the-job and life experiences.

Colleges, universities, businesses and organizations are experimenting with badges and communicating their findings. This is driven by people who are searching for alternatives of attaining recognition for their knowledge and skills, rather than a college degree, to better reflect their qualifications. Southern California’s (USC) service-learning division, for example is trying a new badge platform. The platform is called the Joint Educational Project; and the USC program works with professors to run community-service projects that grant students extra credit for volunteer work (Young, 2012). While no one expects badges to replace what schools, colleges and universities are doing today, there is still an ever-growing interest in the potential of badges to drive motivation and assessment as it relates to competencies. This effort goes beyond
formalized programs that higher education offers and extends into businesses, organizations and other entities looking to offer an alternative.

There continues to be experimentation. The MacArthur Foundation projects could produce the most significant impact of badging technology on K-12 through its ability to allow certification to come from somewhere other than the school (Waters, 2013).

Notable digital badge supporters are the MacArthur Foundation whom had spearheaded the digital badge movement in partnership with the Humanities, Arts, Science and Technology Advanced Collaborator (HASTAC) (Young, 2012). The Mozilla Foundation is leading initiatives particularly in the technology and infrastructure areas with a mission that fosters openness, innovation, and participation on the Internet (Catalano, 2013).

The Mozilla Foundation, the group that develops the popular Firefox Web browser, is designing a framework to let anyone with a Web page – colleges, companies, even individuals – issue forgery-proof digital badges that will give potential employers details about an applicant’s training at the click of a mouse (Young, 2012). Due to the Internet, this is possible. It was not possible twenty years ago. Mozilla’s Open Badges provide a digital image, but also include metadata that details the issuer’s information, criteria for earning the badge, and if desired, a URL to evidence the earner’s mastery (Randall et al., 2013).

A digital badge is an online representation of a skill earned. Open Badges take that concept one step further, and allow for verification of skills, interests and achievements through credible organizations. And because the system is based on an open standard, multiple badges can be combined from different issuers to tell the complete story of earner achievements – both online and off (Mozilla, 1998-2016). This effort by Mozilla has distinguished them from traditional badges that do not offer the metadata.
Mozilla Open Badges are not proprietary and use free software and an open technical standard. This means that any organization can create, issue, and verify digital badges, and any user can earn, manage and display these badges all across the web. The badges can build upon each other, joining together to tell the full story of the earner’s skills and achievement. Each badge has important data built in that links back to the issuer, the criteria was issued under and evidence verifying the credential. Earners then use a backpack, which is an all-inclusive way to collect badges in a single location and display skills and achievements on social networking profiles, job sites, personal websites and more (Mozilla, 1998-2016), Figure 2.1.

The excitement and experimentation may be better communicated from an education perspective, that entity is not the only player interested in badging. Increasingly diverse types of organizations are issuing open badges, including community organizations, museums and libraries (Ahn et al., 2014). As organizations and companies better understand badges, they look at them for motivation, competency acknowledgement and growth in the business of education.

A good example is badges for Vets programs that recognize military job skills. It is hard for Vets to get recognition for these skill sets even though they are easily translatable into civilian skill sets. The Veterans Administration (VA) and its partners have translated Military Occupational Specialty codes to job-relevant skill and competency badges (Finkelstein et al., 2013). These badges are then used with digital resumes and tell the complete story about the earner.

Badges have the potential to fulfill the needs of the earner and those interested in that earner’s skill set they will be displaying. There are some notable evolving badge systems that are gaining in industry-wide acceptance: EDUCAUSE, Intel International Science and Engineering Fair, The American Association for State and Local History and the Yale Center for Emotional Intelligence (Finkelstein et al., 2013).

Another program that exists is in the finance discipline. Institute of Management Accountants (IMA®) is forging ahead in the movement to offer digital badges to promote career success. Previously, members received medallions for their accomplishments in the IMA Leadership Recognition Program, part of the IMA Leadership Academy (IMALA). Now they will receive digital badges. The five ascending levels of achievement (Pewter, Bronze, Silver, Gold, and Platinum) are based on amount of service, courses completed, and other criteria (Stone, 2015).
The gains in popularity are due to the interest in badges by the earner, followed by the issuer and observer respectively. If done right, badges have the potential to tell the bigger competence story of the learner regardless of their path for arriving. The use of digital badges in K-12, and organizations outside the school system are key indicators that digital badges are not going away, and it is only a matter of time where they are typical and be what earners look for and expect.

This is acknowledged by the digital badge programs being developed. As noted by librarian Laura Fleming, who created a digital badge system for about $300 which to date, has been accessed far and wide. Fleming (2013) says that her site, launched in October 2013, provides a fun way for educators to motivate themselves, and be rewarded for their efforts for continuous learning specifically to keep up with technology.

Most adults were taught in a traditional and passive classroom. Online learning environments are also new to instructors, who have to learn new methods for teaching in this kind of setting. Learners and instructors both need to adapt and change as they learn how to use this new medium (Cercone, 2008). The example by Fleming, the New Milford High School digital badge project, supports the need to educate teachers, who will be instrumental to promote and grow digital badges within the school structure. As technology convergence and integration continues to increase generally in our society, it is paramount that teachers possess the skills and behaviors of digital age professionals (Fleming, 2013).

Adult learners are different from traditional college students. Many adult learners have family and job responsibilities including transportation, childcare and household chores that can interfere with the learning process. Most adults enter educational programs voluntarily and
manage their classes around these responsibilities. For the most part adult learners are highly motivated and task-oriented (Cercone, 2008).

Malcom Knowles, who pioneered the field of adult learning, identified the following characteristics of adult learners: autonomous and self-directed; accumulated foundation of life experiences and knowledge; goal-oriented; relevancy-oriented; practical; and need to be given respect (Lieb, 1991). Additionally in order to motivate the adult learner there are six sources of motivation including: social relationships; external expectations; social welfare, personal advancement; escape/stimulation; and cognitive interest. (Lieb, 1991). How adult learners learn and what motivates them has been studied and questioned for years. The characteristics and sources of motivation are the sources and characteristics central to that effort. Today several studies and theories attempt to explain adult learning, and one of the most well-known is the theory of andragogy, the art and science of helping adults learn by Malcolm S. Knowles (Cercone, 2008). Andragogy is a learning theory that is designed to address the particular needs of adults, and it is based on the idea that there are significant differences in learning characteristics between children and adults (Knowles, 1980).

2.3 Gaming and Digital Badges

According to Grubb, the industry advocacy group Entertainment Software Association (ESA), which operates the Electronic Entertainment Expo tradeshow and lobbies on behalf of publishers and developers, revealed a number of facts and figures about the gaming industry Figure 2.2; and the report finds that 59 percent of Americans play games and that the average household in the United States has at least two gamers. According to the ESA in Grubb’s (2014) article, the average of someone who plays online games is 31 years old. In fact, more
gamers are over the age of 36 than between the ages of 18 to 35 or under the age of 18. They are also mostly men, but only by a slimming margin.

![Gamers by Age and Gender](http://venturebeat.com/2014/04/29/gaming-advocacy-group-the-average-gamer-is-31-and-most-play-on-a-console/)

Xbox Live Achievement System is a Microsoft product that introduced badging or Xbox termed achievements Figure 2.3. The way achievements work is that every retail game for the Xbox 360 must have 1000 gamerscore points. These are divided between up to fifty achievements. Xbox Live Arcade games have 200 points usually split between twelve achievements (Jakobsson, 2011).

![Body Juggler](http://www.xbox360achievements.org)
If someone (an observer) wanted to look up the achievement information of other players on Xbox.com, they could as long as they know the player’s gametag, which is the person’s username on Xbox Live. They also could go directly to the person’s gametag if they have the person on a friend’s friends list or in the recent players list. Players (earners) can turn off other people’s access to their friends, and restrict the access to their gaming history to friends only or completely block it (Jakobsson, 2011). Achievement, like knowledge, is only of value if an earner can share it. Sharing achievements by the earner provides the observer, with information about the earner’s gaming ability. The information about a gamer’s achievements includes detailed information about when each separate achievement was unlocked (Jakobsson, 2011) Figure 2.4.

Figure 2.4 Achievement history for Puzzle Quest Adapted from Jakobsson, M. (2011). The Achievement Machine: Understanding Xbox 360 Achievements in Gaming Practices. Game Studies. Retrieved from https://www.hastac.org/blogs/scott-beattie/2014/06/30/types-digital-learning-
A notification pops up on the screen informing a player of the gamerscore value and name of the unlocked achievement when received by a player (Jakobsson, 2011). The earner then can create gamecards, Figure 2.5, for use on websites, blogs and forums, which promote who they are and their gaming history.


Xbox 360 achievements concept has spread to other platforms such as PlayStation and Battle.net. Achievements are, however, nothing new. The Atari 2600 had a similar system in place almost 30 years ago. For some of the Activision games, the manual listed challenges, for instance to score ten thousand points. If the player managed to do this, they took a picture of the TV screen, and sent the photo to Activision, who then would in return send a decorative patch, Figure 2.6, made of fabric to the player.
Part of the appeal of digital badges is the wide range of learner motivations that badges might speak to (Beattie, 2014). As demonstrated, the Xbox achievements, Figure 2.7, took on a life of their own with gamers, motivating them to engage with games to be gathered from. Rounding out a foundation for the digital badge community to start thinking about the next stage in learner badge evolution and attainment, are the types of learning badges that can be offered, based on the Xbox Achievement experience (Beattie, 2014).

<table>
<thead>
<tr>
<th>BADGE NAME</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Completion</strong></td>
<td>Completion of a task with specified outcomes or standards, in a way similar to a conventional assignment or task. These are a weak form of game achievement but can be a way of capturing those who might not otherwise go out of their way to start collecting.</td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td>Badge for ‘coming along’, i.e. no performance expectation or standards. Generally this is seen as a weak learning badge as it does not connect with evidence of learning and a fairly weak game achievement as well.</td>
</tr>
<tr>
<td><strong>Waypoint</strong></td>
<td>Marks partial completion through a task, can act as a guide to progress and as feedback. Some games have their own badging system that runs parallel to the achievement system such as the <em>Borderlands 2</em> ‘Badass Rank’ and these use waypoint badges to add further levels of detail.</td>
</tr>
<tr>
<td><strong>Difficulty</strong></td>
<td>Earned for achieving a goal with an additional, optional condition that makes it more difficult. For example, completing within a certain time, solving a more difficult problem, getting a perfect score, scoring a number of ‘wins’ in a row.</td>
</tr>
<tr>
<td><strong>Competitive</strong></td>
<td>Awarded on the basis of competition with other learners, e.g. the top score on a drill, the first to complete, the top ten on peer feedback scores.</td>
</tr>
<tr>
<td><strong>Collaborative</strong></td>
<td>Awarded when a group achieves an outcome. Each member of a group can have its own specific role, so that this badge first requires gathering a team with appropriate skills.</td>
</tr>
<tr>
<td><strong>Affiliation</strong></td>
<td>Join a group or community. Could include additional requirements such as a participation/introduction task.</td>
</tr>
<tr>
<td><strong>Exploration</strong></td>
<td>Awarded for exploring additional content, meeting objectives which are not necessary to complete the core of a task.</td>
</tr>
<tr>
<td><strong>Collection</strong></td>
<td>Another badge directed at additional content, meeting a set of criteria that is rewarded when each item on the list is met.</td>
</tr>
<tr>
<td><strong>‘Easter egg’</strong></td>
<td>A badge for finding a secret or hidden feature. For learning badges this may be awarded for only the first or first few, to locate the Easter egg because word will quickly spread.</td>
</tr>
</tbody>
</table>


The widespread use of games in the social lives of youth has fueled educators’ interests in developing and investigating game-based learning (GBL) tools (Ebner, & Holzinger, 2007; Huizenga, Admiraal, Akkerman, & Dam, 2009; Van Eck, 2006). Like digital badges, the use of
gaming or game-like activities in learning is still very new. There is very little guidance on how to design a course as a game (An & Bonk, 2009; Fang & Strobel, 2011; Kim, Park, & Back, 2009). Just like course design with game models, mapping a model for digital badges is still very new. Models for educational badges share many of the same features of the Boy Scout Merit badges and video-game models. Like merit badges, educational badges are more often offered for learning that occurs outside of traditional educational institutions. They are viewable on a learner’s online profile by observers, similar to how videogame badges are viewable to other players and how scouts display cloth merit badges on the sashes they wear (Abramovich, Schunn, & Higashi, 2013). And while models are emerging with companies, organizations or entities that are offering digital badges or like, there is little guidance on their practice or design.

One such example of recognizing achievements that exists in LinkedIn, which has been around for approximately ten years, is the practice of endorsements. Endorsement symbols can be found as a word in the section of a member’s profile. Anyone, including the profile owner, can endorse a skill in a profile. According to LinkedIn, accumulating a high number of endorsements for a skill adds credibility to your profile because it shows that your professional network recognizes you have that skill (Stone, 2015).

Members endorse their connections for skills or proficiencies based upon their knowledge or observation of the skill of the person they are endorsing. While someone cannot control endorsements that are added to their profile, they do have the ability to remove anything that they feel is inappropriate or not to their advantage. This ability places the profile owner, or so to speak the earner of that endorsement, in control of what is displayed. Like a digital badge, the earner is the one who chooses to make the digital badge visible to others.
Portable and stackable credentials represent a new approach to allowing the affordable earning of marketable credentials across an entire career (Lowendahl et al., 2016). Treehouse is a website that embraces gamification. Not only are the Treehouse badges a symbol for an earner to share for observers to view, they are a guide for a learner to know the curriculum of badges to earn before unlocking a higher designation badge. As noted by Treehouse, badges are used to guide the user through the curriculum in a way that makes the most sense. Treehouse’s badge map, Figure 2.8, for the HTML badge cannot be achieved without first unlocking all of the child badges. This creates academic structure and flow in a fun and rewarding way. It also means there is no shortcut around learning and understanding tables to unlock the HTML badge, due to the hierarchy of the badge.

![Treehouse Badge Map](http://blog.teamtreehouse.com/inside-treehouse-badges)

Figure 2.8 Treehouse Badge Map. Adapted from Treehouse Island, Inc. (2016). Treehouse.com Inside Treehouse-badges Page. Retrieved February 20, 2016 from http://blog.teamtreehouse.com/inside-treehouse-badges

2.4 Motivation and Recognition Theory

What drives motivation and participation in training courses by people who want to take classes and have work experiences that broadened their knowledge and skills to do their job? Do practices of recognition drive growth in course participation? Features of digital badges lend
themselves well with trends in adult education. Due to the ability to be online anytime and anywhere through the use of mobile technology, there are more opportunities to observe, record and note achievements and milestones. This creates the potential to convey a bigger picture about identity, knowledge, capacity, and achievement, which makes digital badges a powerful and efficient vehicle to bring meaningful data to observers that reflects their achievements (Finkelstein et al., 2013).

Two new research studies that Achor (2016) has been a part of are shaping understanding of the impact of using digital platforms, like social recognition programs, to improve happiness and business outcomes. In short, these two studies suggest that effective digital recognition programs can help scale organic praise, have a high ROI, and lead to significantly higher levels of employee performance and engagement, as well as increased customer loyalty, as measured by net promoter scores (Achor, 2016).

Overall, the basic perspective on motivation looks something like this:

Figure 2.9 Perspective on Motivation
This figure displays that you have certain needs or wants, and this causes you to do certain things (behavior), which satisfy those needs (satisfaction), and this can then change which needs/wants are primary (either intensifying certain ones, or allowing you to move on to other ones). Adapted from “Introduction to Organizational Behavior – 2001” Borgatti, Professor. 2002. Retrieved from http://www.analytictech.com/mb021/motivation.htm

A variation of this model would be to insert a reward or recognition box between behavior and satisfaction. This model could then be viewed from the basis that 1) employees
have a need to learn about products and systems or software to do their job at a company (needs); 2) then take training to develop the knowledge and skills (behavior); 3) are recognized and/or rewarded to developing the knowledge and skills (reward/recognition); and 4) are satisfied by the achievement of knowledge and skills and the reward and recognition.

Since people are different and have different needs, identifying the learner’s perceived value of the reward/recognition is important to be able to design a desirable system for achievement and recognition. Digital badges may not motivate everyone and may produce the opposite effect. Maslow’s Hierarchy of Needs is a theory in psychology that Abraham Maslow proposed in his 1943 paper, A Theory of Human Motivation (Berger, 2005). According to Maslow’s theory, the lower the need the higher the priority, Figure 2.10.

Figure 2.10 Maslow’s Hierarchy of Needs

While the theory is informative and gives a base understanding of needs and a possible pecking order for those needs, it is still more of art than science of what need precedes another and what drives each individual to display a behavior to attain what is desired. Esteem, see Figure 2.10, in a home context is about approval of an individual’s family, friends and community; and, in a job context, esteem is about recognition, high status, and responsibilities. Therefore, a need to understand what people value in digital badges needs to be understood, in order to drive a behavior desired to achieve the digital badge.

Initial informal learner feedback indicated the use of digital badges helped motivate Japanese medical professionals undertaking a course to enable them to use the English language in their professional capacity (Elliott, Clayton, & Iwata, 2014). The authors argue that a micro-credential and digital badge ecosystems would provide institutions with both the infrastructure and framework to empower learners and employees to create a holistic view of their achievements through the pictorial display of earned micro-credential badge collections. Collections enable employees and learners to signal personal achievement to potential employers, professional and social groups (Elliott et al., 2014).

Students earning badges in a system that sets incremental attainment leading up to bigger goals provides recognition for achievement along the way. As Schunk (1990) explained, “when students perceive satisfactory goal progress, they feel capable of improving their skills; goal attainment coupled with high self-efficacy, leads students to set new challenging goals” (p. 71). There is a growing movement toward allowing students to earn digital badges, micro degrees, nanodegrees, certificates and a host of other forms of micro credentials. Competency-based Education (CBE) and a drive to any pace learning, to short seat time, and cost of education are highly related to this trend (Lowendahl et al., 2016).
Investigators working within a social cognitive learning theory framework view self-regulation as comprising three sub processes: self-observation, self-judgment, and self-reaction (Bandura, 1986; Kanfer & Gaelick, 1986; Schunk, 1989). A model highlighting goal setting and self-worth is portrayed in Figure 2.11.


Learners enter learning activities with such goals as acquiring knowledge, solving problems, and finishing workbook pages. Self-efficacy for goal attainment is influenced by abilities, prior experiences, attitudes toward learning, instruction, and the social context. As students work on tasks, they observe their performances, evaluate goal progress, and continue their work or change their task approach. Self-evaluation of goal progress as satisfactory enhances feelings of efficacy; goal attainment leads students to set new challenging goals (Shunck, 1990). Scouting offers an example of goal attainment leading scouts to attain goals recognized by the cloth merit badge. They are self-guided in the badges they want to earn and the amount of badges they would like to earn as well, which culminate to higher level badges and recognition such as Eagle Scout.

Digital badging facilitates incremental goal attainment and lends itself to a program that incorporates badging for motivation and achievement. According to Hayek (2015), the practice
of teaching adult learners provides somewhat of a blueprint for helping adult learners engage, retain and apply their educational experiences to life. It offers defining characteristics of the adult learner that can be used to make positive changes to curriculum: self-directed, self-motivated, goal-oriented and seeking practical applications with real-life relevance. Building a digital badge program for adult learners should 1) identify the types of skills, knowledge, and behaviors that can be measured; 2) recognize skills as stepping stones toward larger goals; and 3) create comparability across programs nationally so that a badge for technicians in a specific industry means the same thing across companies who are in that industry (Finkelstein et al., 2013).

According to Treehouse (2016), incorporating digital badges with learning challenges users to set and meet goals. For example, Treehouse notes that a learner may only plan to learn HTML; but when they realize the design foundation badge cannot be achieved without also unlocking the other badges, their goals are broadened. This forces the learner to step outside their comfort zone to learn topics they might otherwise have avoided, thus creating self-motivation. It also introduces content to a user who would not have initially explored it on their own.

Treehouse (2016) also feels that their offering of badges is an affirmation of a job well done. Once a Treehouse member has watched the videos, passed the quizzes, and succeeded in the code challenges, a message and the awarded badge pops up, Figure 2.12, affirming their success. Badges in application design serve as a virtual trophy to make the user feel as though all their effort (beyond the knowledge they retain) is worth it in the end. The virtual trophy can then be displayed on their virtual shelf – or profile page – to remind others and them of a job well done.
In manufacturing environments, much is changing quickly, just like it is anywhere in business. With that said, everyone needs to be a continuous learner, and businesses need to promote incentives, such as digital badges, to recognize those efforts to learn. In an article by Segrest (2016), Clinton Davis is quoted when asked for his advice for maintenance and repair professionals in a manufacturing environment, “Never stop learning. Always try to learn more than is necessary to perform your day-to-day duties. If you are being hired as a trades’ technician to do maintenance in a facility and you have an opportunity to learn about a different area, pursue that. Cross train when you have the opportunity. Always be willing to learn something new and be a resource for others” (p. 18).
Over the past few years, many trade publications and academic institutions have highlighted employer’s concern toward employee preparedness and skill attainment in the workforce. Employers are seeing disconnect between what prospective employees are learning through academic as well as professional avenues and what the employers need in their employees (Spiller & Scovotti, 2008). Job-related skill verification is often a time consuming process for employers to determine (Young, 2012). Furthermore, in many situations prospective employees may have taken a more informal learning approach and employers may question whether or not these applicants really have the skills to succeed in the business (Young, 2012) (Dalby, Merriman, & Dalby, 2013). Digital badges present an opportunity to capture information about the learner’s knowledge and skills and display them in a way that employers can easily recognize and acknowledge their validity.

2.5 Growing Up with Technology

People, who do not find the complexity of the digital era and constant updates in the field of technology problematic, are generally referred to as “Digital Natives”. Digital natives are today’s young people who were born into the digital era and are growing up exposed to the continuous flow of digital information (Dinglil & Seychell, 2015). In general, digital natives were born after 1980. Email emerged in the 1980s, and the World Wide Web debuted in 1991. Search engines began to emerge. After that blogs and social networks emerged. Digital badges are just an extension of the digital environment that digital natives do not find difficulty and accept the changing landscape as normal evolution.

Digital badges serve multiple parties with a badge transaction: earner, issuer and observer. The earner is served by attaining and displaying the digital badge; the issuer is served
by the earner displaying the badge earned from them; and the observer is served through finding earners that are displaying the digital badge achieved for the proficiencies or skills needed. While all play a part in the process, the issuer and observer are both served through the earner displaying the digital badge. If there is no motivation to display a digital badge once it is achieved, the effort may be for not.

Game-based learning replicates games and game structures. Game attributes are defined as features and characteristics inherent in its structure and are likely to initiate and maintain interest in gaming activities (Hull, Williams, & Griffiths, 2013). Feedback is one of the essential attributes of good instructional games (Ak, 2012; Turkay, Hoffman, Kinzer, Chantes, & Vicari, 2014; Van Eck, 2006; Wouters & Van Oostendorp, 2013).

While feedback is an important aspect of instructional games, it is also important that it is timely as well. Immediate feedback is found to create positive emotions, which help in increasing students’ motivation and eventually improve results (Dominguez, Saenz-De-Navarrette, De-Marcos, Fernandez-Sanz, Pages, & Martinez-Herraiz, 2013). Badges in application design serve as a virtual trophy to make the user feel as though all their effort (beyond the knowledge they retain) is worth it in the end (Treehouse, 2016). On the other hand, feedback that is delayed, untimely, or out of context, can affect learning negatively by lowering student motivation levels (Dominguez et al., 2013). Feedback in online gaming systems provide information on achievement levels by tracking scoring in the games and status based on how the gamer is ranked among others. Game elements are the tools and techniques that students directly experience and are influenced by the design choices selected as well as the game attributes. These include rewards, levels, badges, leaderboards, challenges, redo or do-overs, hidden items, bonus items, and surprising changes in game play (Alaswad & Nadolny, 2015).
As GBL is still on its upward climb, attributes such as badges are on this climb as well. Using badges in gamified environments motivates learners by creating highly engaging, skill-related, and sequential sets of learning tasks (Dicheva et. al., 2015). Digital badges extend the opportunity to recognized incremental achievements in learning programs.

Entities who create digital badging programs think about the structure of their digital badge system and nest digital badges to recognize small achievements leading up to larger achievements. As badges have mastery and performance elements instilled within, they may be used for setting focused sub-goals to enhance student achievement (Dickey, 2005). Furthermore, they could be organized into mastery and performance goal categories (Abramovich, Schunn, & Higashi, 2013), which employ the points system to quantify the criteria for receiving a badge (Alaswad & Nadolny, 2015). The badge map for HTML, as noted by Treehouse (2016), shows that the HTML badge cannot be achieved without first unlocking all of the child badges. This creates academic structure and work flow in a fun and rewarding way incrementally navigating the learner to their ultimate goal.

Goal attainment of a digital badge satisfies accomplishment. Erhel and Jamet categorized GBL goals in terms of understanding reasons behind student engagement into two categories: mastery goals and performance goals. “Mastery goals are concerned with students’ preferences to establish new skills, gain new knowledge, or develop new sets of abilities. Performance goals are rather concerned with exhibiting and validating ‘one’s’ ability to succeed, particularly by surpassing others while expending as little effort as possible” (Erhel & Jamet, 2013, p. 157).

This goal attainment can be recognized in the form of a digital badge, which can tie the attainment details to the credentials of the digital badge. These credentials include the recipient (who earned the digital badge); issuer (the organization that bestowed the badge to the recipient;
criteria and description (efforts to earn the badge); date (day when the badge was awarded); expiration (date the credential is no longer valid); certificate or assentation (verifying the validity of the award) (Finkelstein et al., 2013). As Dale Schunk explained, “When students perceive satisfactory goal progress, they feel capable of improving their skills; goal attainment coupled with high self-efficacy, leads students to set new challenging goals” (p. 71).

2.6 Education Value of the Digital Badge

There are three key groups that drive perception of digital badge value: earner, issuer and observer. The evolution of mobile device technology – smartphones and tablets - and the applications that fuel them has saturated the market. Is there any wonder that badges are a growing trend? The United States Secretary of Education, Arne Duncan, called badging “a game-changing strategy” and offered a $25,000 prize for the best badge concept serving veterans seeking skilled jobs (Waters, 2013).

For the earner, badges provide an alternative path from formalized education that accounts for the skills and knowledge they have attained through multiple jobs, schooling, volunteerism, and service to Country, that are recognizable as applicable career skill sets notable on a resume. A badge marks a milestone that gives a sense of pride for having achieved something of value and awareness that new opportunities might be unlocked as a result of the achievement (Finkelstein et al., 2014). While the creation of a badge is still in process and needs more work with greater acceptance, once earned the badge is a constant across industries or disciplines where earned, for which the earner would value. For an earner, the badge represents a measure of how much time and effort is put into earning it; and when displayed, could be recognized by those observing it.
Other reasons that earners would value a badge include: the badge would provide a life-long learning and recognition model; an overall and incremental progress of achievements; motivation; recognition for prior learning such as soft skills; new forms of achievement; alternative forms of evaluation to demonstrate competency; individual pathways; and curation of public identity (Finkelstein, 2014).

There are many good reasons to incorporate badges in an online system. They serve as a way of expressing what is valued by a community, they encourage participation, they provide the means to identify more closely with the learning experience, they are a visual cue for observers and social marketing for certain communities (Halavais, 2012). According to Treehouse (2016), digital badges create a sense of community. Publicly showcasing unlocked badges on users’ profiles and announcing achievements through social networks creates buzz for non-members and inspires current members to keep learning. It also allows the user to see what badges they have in common with other members. It is this bond with each other that emphasizes it is a journey they are all taking together.

The issuer is another important participant to the digital badge transaction. The issuer can be an individual, school, employer, institution, community or group. These issuers create the credentials that represent skills, interests, and achievements that an earner would value. The issuer benefits from the simple act of bestowing a badge to those who meet the requirements they have set. Recipients are a reflection of the issuer that helped them to earn the badge and who endorsed their abilities. The badge then turns into a marketing component for the issuer. The earner connects the digital badge to resumes, social websites such as Facebook, employer facing websites such as LinkedIn and Monster. It markets the issuer to connections who may want to attain the badge but to other observers who may value the badge or brand.
Another connection for issuers to use badges as a marketing component is to work with other institutions who may endorse the issuer’s badge, such as a university or a standards board. The visibility of that badge offered by a company with endorsements extends the brand of the company and makes this valuable for the issuer. If the learner did come into a university that had endorsed a company’s badge, the earner may be recognized for those badges earned.

Observers include employers, acquaintances, friends or family who may see the badge on a professional or personal website and a resume. An observer who is reviewing the representation of an achievement is also deciding whether and how to value it, and is also learning about both the issuer and the recipient (Finkelstein, 2014). Badges provide important verifiable information to employers about an individual’s varying skills, backed by evidence. Badges can represent a well-rounded picture of knowledge and competencies that résumés and degrees do not reflect (Alliance for Excellent Education, 2013).

Employers want highly trained, knowledgeable and motivated employees. In today’s work environment, everyone needs be a constant learner. With technology advancements many people already are constant learners keeping up with the technology on their mobile devices. Badges provide a vehicle that shows incremental achievements for continuous learning that leads up to a larger accomplishment. The employer may observe that the learner is in progress to achieve an MBA and also is recognized for soft skills, such as serving as board member for a local soccer club, both supporting badge achievement.

Emerging educational credentialing, such as digital badges, aim to better support evolving labor needs using an online just-in-time system of learning. Metadata links badges to standards and competency-based frameworks, providing potential employers with an easy method to validate the authenticity of the badge and specific knowledge and competencies.
earned by the job applicant (Foster, 2013). Baby boomers are exiting the workforce and with them exits knowledge. Business and governmental proponents see badging as a promising tactic to open pipelines of talent while easing a growing shortage of knowledge workers (Young, 2012).

Part of the appeal of open badges is their potential to increase student autonomy and self-regulation, which has been shown to be one of the best predictors of student performance (Pintrich & De Groot, 1990). “Self-regulated learning theory recognizes the important role that students play as active participants in their own learning by how they plan, set goals, organize, self-monitor, and self-evaluate” (Zimmerman, 1990, p. 4).

A badging system can potentially support self-regulated learning by offering very specific and attainable goals as badges. In additional, a badge system can offer multiple choices of badges for students to complete, giving the student greater choice and autonomy. Instead of expecting student to complete an entire course in the same sequence and by completing the exact same requirements as all their peers, students might be allowed to choose badges that are interesting to them within the discipline (Randall et al., 2013). The student is now engaged as an active participant.

The Waikato Institute of Technology has undertaken a number of initiatives that investigates the infrastructure and framework required empowering learners /employees to create a holistic view of their achievements through the earning and pictorial display of earned micro-credential / badge collections. These collections enable learners to signal current capabilities and personal achievement to their peers, employers, professional and social groups (Elliott et al., 2014).
Digital badges hold promise to encourage the earner to participate in the learning being motivated by the opportunity to earn a meaningful badge that can be documented. The authors, Elliott, Clayton and Iwata (2014), argue that a micro-credential and digital badge ecosystems would provide institutions with both the infrastructure and framework to empower learners and employees to create a holistic view of their achievements through the pictorial display of earned micro-credential badge collections.

Current digital badges, also known as open badges, utilize technology to address earlier issues of credibility by linking meaningful metadata to the graphic emblem. The supporting technologies provide an accessible and ongoing means for teachers, learning institutions, organizations, and employers to verify the authenticity, validity, source, and value of the earned badge (Erickson, 2015).

A disruptive innovation is an innovation that creates a new market and value network and eventually disrupts an existing market and value network, displacing established market leaders and alliances. The term was defined and phenomenon analyzed by Clayton M. Christensen beginning in 1995 (Disruptive Innovation, 2016). Digital badges could be seen as societal disruptors, in accordance with theories on disruptive innovations. (Christensen, Horn, & Johnson, 2011) have explained that sustaining innovations are innovations that do not create new markets, but rather offer better value in existing markets, Figure 2.13. Disruptive innovations, however, create their own markets by competing with non-consumption (Randall et al., 2013).
There is a growing movement toward allowing students to earn digital badges, microdegrees, nanodegrees, certificates and a host of other forms of micro credentials. These are issued by traditional, nontraditional and for-profit initiatives that offer advanced skills certifications. They are growing in popularity and, in some disciplines, are serving as shorter and less expensive pathways toward professional success (Lowendahl et al., 2016). Digital badges, depending on the program they are earned within, provide a path for a student to attain successes along the path to the higher goal to be achieved. As students earn badges, they receive feedback on their learning progress, which can in turn confirm their abilities to reach their goals. In contrast with a typical course that gives the student no credential until all assignments are complete, badges give the students recognition for each milestone. When students perceive
satisfactory goal progress, they feel capable of improving their skills; goal attainment, coupled with high self-efficacy, leads students to set new challenging goals” (Schunk, 1990, p. 71).

As yet, badges are too new to have been researched, but theoretical constructs such as self-regulated learning, student autonomy, and student intrinsic motivation would suggest that additional choices and performance feedback offered by a digital badging system would potentially provide great benefits (Randall et al., 2013).

Treehouse is one website that seems to be on a successful path of issuing digital badges, much like a gaming environment. Its strategy is to offer short challenges to help ensure that students understand the material. After successful completion of key challenges, badges are unlocked, displayed on a person’s profile, and becomes shareable via social media. “These badges are meant to increase motivation, spur a little bit of competition between users, and provide gaming mechanics that help make the longer-term learning process more engaging (Zomick, 2013).

2.7 Criticism and Skepticism of Digital Badges

There is still more to learn about the design and development of digital badge programs and how they are perceived by the earner and what motivates them to earn a digital badge. Even supporters of the badge idea concede that digital badge programs could lead to problems. Dale Doherty, editor of Make Magazine, likes the approach, but he worries that there will be sites that just dispense badges like candy, and that does not help create any kind of credential or meaning around them (Young, 2012).

A librarian from New Milford High School in Bergen County, NJ, created a digital badging system to motivate teachers in learning new skills for approximately $300. While
Barbara Fleming has been recognized by Milford principal, Eric Sheninger (2013), for laying a program out that credits skill attainment for teachers at Milford, there may be dilution of the value as Fleming notes that she adds a new badge each week or so. Digital badging programs need to be well thought out and align to larger goals that are desirable for the earner. If not, earners will not seek out the badges and they will not have high value to the observer. In Fleming’s instance, the digital badges earned by teachers at the Milford school may not be recognized or valued at another school district. By not being recognized broadly, the program itself is immediately diluted due to the sheer number of people who could earn and display the badge and those who could observe it recognizing its value.

It is important to note that behind the digital badge is the technology that enables the digital visual component and the educational achievement information to be viewed electronically and validated immediately. In turn it allows the earner to display it digitally in order for others such as current and potential employers, co-workers, friends and others to view their accomplishment. This can be on social or work related networks. While this is the value of the digital nature to the badge, most importantly the education or program behind the badge is what matters. If the badge is given only for attendance at a course or seminar, for example, then the meaning or significance of the badge is diluted as it does not represent an educational or notable achievement. The badge must have perceived value by the earner in order for the earner to seek out education or experiences that offer a digital badge to display. It is what’s behind the digital badge, not the badge itself. Digital badges represent an electronically visual method to display their competence.

Fleming thinks carefully about what skills each badge will cover and wants the value of the teachers earning the badges ultimately to bring value to the students who learn from them.
The risk for Fleming and anyone else creating badges is that criticism will run rampant more for the lack of thought and effort exercised creating the education or assessment for the new competency being validated by the digital badge. Additionally, the badges are offered only to those in that school system, which makes them only recognizable to a small community of people: the teachers and administration. If the badges were to be viewed by students, students’ parents or members of the community where New Milford High School is located, they may not recognize the value of the badge.

Like Certificate of Completions, digital badges or certificates may mean very little. When they are given out for just sitting through a seminar or event that does not require any demonstration of the behavior learned or assessment of knowledge or skills, it can completely dilute the achievement and display of the badge or certificate. According to Zomick (2013), a certificate of completion does not mean very much. It is a bit like when you got a trophy in third grade soccer simply for showing up. Many online course providers dole them out to students who have simply sat through the entire video, including learning libraries like lynda.com.

If a learner takes a course from lynda.com, they receive a Certificate of Completion, Figure 2.14. When a learner watches a video, it is marked with an eye icon, which means the video has been watched. When the learner watches all the videos within that learning section, the *certificate of completion* becomes available for printing or sharing via email or some other social or community website to be viewed by others. With no testing mechanism on lynda.com, the earning of the certificate is diluted or may be perceived as less meaningful.

According to Zomick (2013), shortly after launching the certificate feature, founder Lynda Weiman posted a blog post requesting feedback about inclusion of testing in certification. The question in and of itself demonstrates that completion certificates have very limited educational value. Another example is the Xbox Achievement for “Participation”. Generally this is seen as a weak learning badge as it does not connect with evidence of learning and a fairly weak game achievement as well (Jakobsson, 2011). Evidence shows that there is still much to learn about the value of the digital badge in general for earners, issuers and observers. Higher education is not immune from the evaluation of digital badges and credentialing.

According to Erickson (2015), the evolution of digital badge credentialing compounds implications for higher education. LaCelle-Peterson, Rigden, and the Teacher Education Accreditation Council (2012) insist higher education will eventually be forced to decide whether to award credit for non-collegiate activities.

**Summary**

This chapter covered the history of badges that included the Greeks, United States Armed Services and Boy Scouts badging program. Starting with the Greeks, laurel wreaths were used to
acknowledge accomplishment and provide visible recognition for military, acts of heroism and athletic accomplishments. Next, the armed services honors their enlistments through the use of medals or badges acknowledging them for their years of service, rank and special accomplishments such as heroism. Last, the Boy Scouts honor their members through the use of cloth badges for competencies demonstrated. The badges are sewn onto a sash that is worn by the Scout with their uniform. All of awards, laurel wreath, medals, and cloth badges, are visual emblems worn by the receiver of the award providing recognition of their achievement. They were designed to not only provide recognition, but motivation to strive for goals.

The review then extended to evaluate the history and components of the gaming world. Due to the digital nature of the games, they like the Greeks, Armed Services and Boy Scouts, provide player motivation, recognition and achievement through the use of badges or “Achievements” used by Xbox. The badges were symbols to other players on what they could do in the game and their status. Unlocking Xbox Achievements motivates a learner to continue to play. The average age of gamers is 31 and closely split between male and female. This is important to note because one might think just children who are 18 years old or younger play these games.

To understand the value and role of the laurel wreath, medals, cloth badges, and digital badges, it is important to understand how motivation and recognition drives participation. As noted by the Perspective on Motivation model, Figure 2.9, a person’s needs drive their behavior which satisfies the needs. Digital badges help facilitate incremental goal attainment and lend themselves to a program that leverages them for motivation and achievement. Noted by Anchor (2016), two new research studies are shaping understanding of the impact of using digital platforms, like social recognition programs, to improve happiness and business outcomes. In
short, these two studies suggest that effective digital recognition programs can help scale organic praise, have a high ROI, and lead to significantly higher levels of employee performance and engagement, as well as increased customer loyalty, as measured by net promoter scores.

Connecting gaming and a gamer’s motivation to play and continue to play to motivation and recognition is valid and to acknowledge that the digital badge in an online game offers timely communication and is part of the motivation/recognition equation. Feedback in online gaming systems provide information on achievement levels by tracking scoring in the games and status based on how the gamer is ranked among others (Alaswad & Nadolny, 2015). Feedback that is delayed, untimely, or out of context, can affect learning negatively by lowering student motivation levels (Dominguez et al., 2013). The literature reinforces the importance to design a digital badge program that incrementally provides learners with feedback along their journey to learn knowledge, skills and behaviors to be successful.

Mozilla and MacArthur Foundations extended the development of digital badging programs. Notable digital badge supporters are the MacArthur Foundation whom had spearheaded the digital badge movement in partnership with the Humanities, Arts, Science and Technology Advanced Collaborator (HASTAC) (Young, 2012). MacArthur’s philanthropy has allowed and continues to allow for numerous experimentation projects.

Mozilla extended the MacArthur efforts. They (Mozilla) enabled companies to issue forgery-proof digital badges that will give potential employers details about an applicant’s training at the click of a mouse (Young, 2012). Due to the Internet, this is possible. It was not possible twenty years ago. Mozilla’s open badges provide a digital image, but also include metadata that details the issuer’s information, criteria for earning the badge, and if desired, a URL to evidence of the earner’s mastery (Randall et al., 2013). The problem of granularity is
approached by open micro credentials (such as Mozilla’s Open Badges). A good example is the University of California, Davis, where traditional credits in a new undergraduate major in sustainable agriculture and food systems are complemented by awarding open badges for seven core competencies. Even more interesting is that these competencies and corresponding badges were designed together with potential employers (Lowendahl et al., 2016). This effectively has taken digital badging to the next level incorporating the game-changing element of validation and partnerships driving equity and consistency.

The literature review reinforces the importance to design a digital badge program that incrementally provides learners with feedback along their journey to learn knowledge, skills and behaviors to be successful. Each digital badge earned needs to be significant in the learner’s progression to learn and achieve a higher goal. Boys Scouts have such a program that culminates to the Eagle Scout badge and honor. As noted by Treehouse (2016), a learner may only plan to learn HTML; but when they realize the design foundation badge cannot be achieved without also unlocking other badges, their goals are broadened. Skepticism is rampant when a digital badge is earned for nothing, such as Xbox “Participation” Achievement. If the digital badge is watered-down in value and there was no thought as to what it represents, then potential earners are not motivated to take learning that would offer the digital badge or; if earned, the earner would not display it. This places the responsibility on the issuer to create a clearly defined badging program that earners want to participate in and observers seek out.

There are three principals in any type of program that bestows recognition of some type: earner, issuer and observer. Each plays a part in the success of a digital badge program. The issuer needs to create a program that is well-designed to motivate earners to achieve the digital badges and then to display them. The earner has to have interest in and see value for the digital
badges to be earned. And last the observer needs a quick way to identify and seek out those who have the digital badge. While all (earner, issuer, observer) may function independently of each other; in order to have a successful digital badge program, they all must rhythmically and harmoniously participate in digital badging.

The “Credentials Craze” (Mooney, 2015), an increasing perception of mismatch between traditional education output and employer needs, is fueling a re-invention of credits (Lowendahl et al., 2016). The reinvention of credits and the movement to embrace digital badges that can be credentialed is coming. Reinventing credits is an emerging business trend that we believe will have a great impact on educational institutions. In the short term, it will mean more digital ways for students and employers to effectively match jobs and skills (Lowendahl et al., 2016). The question is not will digital badges reach critical mass. The question seems to be when and how.
CHAPTER 3 METHODOLOGY

This chapter presents the methodology that guided this research study. The purpose of this quantitative study was to explore the perceptions of learners who would also be the earners of digital badges. The learners are in a manufacturing industry taking courses on skills and knowledge for the products their company has purchased and uses within their facility.

Of interest for this study is their understanding and awareness of digital badges; perception of digital badge value; their interest level to earn digital badges for courses taken and if there is a perceived higher value of courses with digital badges versus those without; and what would motivate them to take a course with a digital badge. The researcher’s intent was to focus on the interest and the likelihood the earner would prefer courses with digital badges versus those without as there would be a perceived value or benefit of the digital badge. Additionally, as digital badges become more known and understood, there would be a higher probability participants would take a course offering a digital badge over one without, thus driving growth in courses offering digital badges.

The methodology addresses three areas: participants, instruments used and how the instruments were used. The first discussion will be about the participants including how they were obtained and the possible environments they were in to provide feedback for the online survey.

The second area explains the instruments used and the method for each instrument. These procedures cover the initial survey sent out and then the follow up survey for those participants willing to be contacted in order to gather additional information. These procedures cover the necessary steps needed to be completed prior to the study, items to address in order to
receive permission to ask the questions in the study, as well as the necessary steps and procedures to secure confidentiality of participants and data files.

The third area includes the data analysis tools used to ascertain the results of the study especially those participants who provided additional information from a second set of data.

3.1 Participants and Research Design Procedures

The participants included one-hundred-and-twelve (112), learners attending courses on product or system training for a manufacturer that distributes globally providing products and services. The participants ranged from Baby Boomer (born between 1946 and 1964) to Gen2020 (born after 1995). All of these learners were either currently in a course or had taken a course previously from the manufacturing entity. It was assumed that the majority of these students would fit predominately into a “Digital Native” category and therefore experienced with using online technologies such as electronic email and being able to successfully use mouse clicks and type. They were able to respond to the initial online survey provided to them through email and requiring them to click on a URL link.

Participants were emailed inviting them to participate in an online survey about digital badges. The email address was automatically pulled from a database of addresses for students who were currently in the process of taking classes or who had taken classes from the particular manufacturing company. There was no access to see the nomenclature of the email address or select it to view any information. The email was sent out on Friday, January 29, 2016 at approximately 7:30 p.m. Central US Standard Time.

The email invited the participant to take an online survey. If they did not want to take the online survey, they did nothing. However, if they chose to participate, they were asked to read
the consent information. After reading the consent information, if they agreed, they were directed to click the URL embedded in the email. By clicking the URL, per the consent form information, they were giving their consent to participate in the online survey.

The participants’ material type was the use of technology. The technology tools presumed to have been used by the participants included personal computers, laptops, iPads and other technology devices such as a smartphone that could receive an email and connect to the online survey tool. These devices were used to take the online survey provided by a URL address originating from the email sent to their email address. The online survey was created on SurveyMonkey, which is an online survey generator that afforded data collection for individual and culminated responses of the survey questions. An Excel report of the data exported was used with the JMP tool for analysis.

3.2 Instruments and Methods

The potential participants first received an email inviting them to the online survey (Appendix A). Unsurprisingly, there is increasing growth in the use of web-based surveying for course and teaching evaluation (Hastie & Palmer, 1997; Seal & Przasnyski, 2001). There are so many advantages associated with the use of information technology to support the use of web-based surveying. This is due to the immediacy of the potential response and the use of online tools to analyze results. The email consisted of information communicating the survey topic, risks, benefits to complete the survey, a statement letting them know they could stop participating at any time, and a consent statement. If the potential participant agreed to be part of the study, they would click the URL in the email, which directed them to the online survey. If they chose not to participate, they did nothing.
After being directed to the URL for the survey, the participant was directed to read a definition for “Digital Badges” (Appendix B). The intent of providing the digital badge definition was to baseline each participant with an equal understanding of the term.

This was followed by the actual survey questions (Appendix C). The first three survey questions asked participant to define characteristics about themselves: gender (male or female); age (Pre 1946, Traditionalist; 1946-1964, Baby Boomer, 1965-1976, Gen X; 1977-1997, Millennial; and after 1995, Gen 2020); and education level (Some high school, no diploma; High School Graduate, diploma or GED; some College, no degree; Trade, Technical and/or Vocational School; Associate Degree; Bachelor Degree; Master Science/Arts; and Doctorate).

The remaining questions on the survey used a Likert scale of one to five, with one being “Not at all likely” or “Not at all valuable”, and five being “Extremely likely” or “Very valuable”, or used comment boxes. The questions included the following: “Prior to this survey, were you aware of digital badges;” “After reading the definition of a digital badge initially provided, what would be your level of interest in earning a digital badge for a course or courses taken;” “What is the reason for your rating in Q5;” “What is your perceived value of having a digital badge to display;” “What is your perceived value of a course where you earn a digital badge;” “What is the reason for your rating in Q8;” “What type of digital badges would you be interested in earning if available to you as an adult learner;” “How likely is it you would display a digital badge earned on a public or social website and/or a digital enabled source such as a digital resume;” “What is the reason for your rating in Q11;” “Would you be willing to be contacted to gather additional information based upon this initial survey;” and if the learner agreed, they were asked to provide their first name, a contact phone number and a good day and time to contact.
A follow-up survey was conducted with participants who 1) agreed to provide additional information, and who 2) provided their first name and a contact phone number. When calling the participant, a script was used to respond appropriately on whether or not the participant answered. After this script was executed, the following questions were asked: “On a scale of zero to ten with ten being extremely likely and zero being not at all likely, how likely is it that you would recommend a course with a digital badge to a friend or colleague?”; “You as a learner could potentially earn a digital badge by taking a course that offered one. What is your biggest concern and/or curiosity about digital badges?”; and “On a scale of zero to ten with ten being extremely likely and zero being not at all likely, how likely is it that you would sign up for a course with a digital badge over the same course that did not have one?”.

3.3 Data Analysis

Data analysis tools included SurveyMonkey.com, Excel and JMP. SurveyMonkey.com was used to collect the data per respondent. SurveyMonkey.com allowed for an online survey via a URL linked to an email for access by the participant. The participants then completed each question they felt comfortable to do so. They were not required to complete all questions. Once the participant clicked the “Done” button, their responses were submitted to the SurveyMonkey.com system.

Data was exported from SurveyMonkey.com into an Excel spreadsheet. Basic data including totals for Gender, Age and Education, were totaled and summarized through the use of graphs in Excel. Individual responses were then manipulated in the JMP tool. JMP (pronounced "jump") is a computer program for statistics developed by the JMP business unit of SAS Institute. JMP software from SAS provides power to understand what data is telling. Regardless
of an individual’s statistical savvy, answers can be uncovered that spreadsheets tend to hide
(JMP, n.d.). JMP produced the categorized analysis.

3.4 Research Procedures

The study began with the researcher completing a training course entitled, “Protecting
Human Research Participants.” This study will take only participants who agree to be part of the
study, and they will be allowed to withdraw from it at any time without using any of their
information. No marketing to the participant will be done based upon their involvement in this
study or due to the results of it.

This was after obtaining approval from the university Institutional Review Board
(Appendix F). Upon completion of the exempt-study form and following approval from the
university, work began to gather data from participants.

It was determined that the participants would come from a manufacturing company sold
products and services globally who were either in or had taken a course from the manufacturing
company offering training. The initial survey included 112, which is 8 percent response rate out
of a sample size of 1428 people, who had attended training courses offered by the manufacturing
company followed by attempting to gather additional information from 33 people out of the
initial 112 original respondents. Out of the secondary sample size of 33 people, follow-up was
made with 22 people, which is a 67 percent response rate. With increased use of technology to
exercise surveys and evaluations, little is known about response rates obtained in electronic
surveys, or whether different modes of administration yield similar patterns of results
(Richardson, 2005). In comparison studies, data show that online surveys do not achieve
response rates that are even close to what is achieved with paper-based surveys (Nulty, 2008).
While there are recommended practices that could be used to increase response rates such as
sending frequent reminders and extending the duration of the survey, they were not viable solutions to increase participation in this particular study.

The initial online survey was set up with an online survey tool. An email was created that invited the participant to be part of a survey for digital badges. Consent information was provided in the email to the participant and a URL link was added to the email for the participant to click on if they agreed to participate in the study. If they did not want to participate, they did nothing. Once they clicked on the URL, they were directed to the online survey.

First, they were instructed to read the definition for digital badges (Appendix B). Once they read the definition, they started answering questions that included three questions about them including: Gender, Age and Education. Next, they answered question on their awareness, interest and perceived value of digital badges. Last, they were asked to participate in an additional survey. If they agreed, they were asked to provide their first name, contact phone number and a good day/time to contact them.

Each person who agreed to be contacted was called. Out of the 33 agreeing to be contacted, 12 were interviewed. When called, if they were not available, a message was left for them. They were not called a second time. If they answered when called, a script was read to them. This script included an introduction of the primary researcher. They were thanked for their initial results and thanked for their willingness to participate in a follow-up survey. They were first asked if the current time was good for them to answer additional questions. If not, a different time was scheduled with them. If it was a good time, they were then asked if there were any questions they had before getting started with the interview questions. If they had questions, they were answered. If not, they were told that they would be asked a series of questions; and at any time they did not want to answer a question, they did not need to and could
stop the survey at any time. Once this was explained and there were no further questions, the follow-up survey was started. The participants answered additional questions on their awareness, interest, value and benefits of digital badges and courses with digital badges.

3.5 Participants in Study

The target audience for this research is customers who are taking or have taken educational offerings from a large manufacturing company that sells education to its customers who also may or may not buy their products, systems and services. The manufacturing company has global learning centers staffed with educational leadership, instructors, designers, developers and administration, although at varying staff levels. Learners in the context of the manufacturing facility are considered customers and do have a choice on what training they want to attend and where they to attend it. These learners provide the support in companies through roles such as being technicians or engineers. They are responsible to plant operation, maintenance and trouble-shooting for repairs.

This target audience was, for the most part, adult learners who might or might not be in formal institutionalized education; may or may not have developed skills and knowledge that apply to what needs to be learned for the products, systems and services offered by the manufacturing facility offering the learning; and are motivated to learn, as the skills and knowledge are directly applicable to the job they need to do for the company they are with.

Students attending the training courses have varying knowledge and skills based upon their prior education, work experience and work-related training. Due to this, it is acknowledged that the learners have developed competencies outside of the education offered by companies that can be applied and recognized prior to a course they desire to take. From this pool of
learners, all were sent the initial survey and it was their choice if they participated. It was also their choice to participate in the follow-up survey; however, this group came out of the original pool of those choosing to participate in the first online survey.
CHAPTER 4 DATA ANALYSIS & RESULTS

This chapter provides the data analysis and results of this study. The data were collected and analyzed to produce responses to the research questions posed in Chapter 1. For the purpose of this study, learners who are potential earners of digital badges will be surveyed to determine the following:

1. Level of awareness, interest, and value learners have for digital badges;
2. The value for courses with digital badges; and
3. Their willingness to seek out and display digital badges.

4.1 Participants’ Demographics

First, three questions were asked to determine traits of the participants including gender, age and education level. Out of one-hundred-and-twelve (112) respondents, the results show as follows.

The majority of the participants to this survey were males (87 percent), Table 4.1 Respondents by Gender. This is not surprising based upon the manufacturing / engineering demographic of the population providing input to the survey. At this time, there is no reason to believe that gender has an impact to the various questions asked regarding awareness, interest, or perception of value and benefits.
A good percentage of the respondents were either Millennial, at 43 percent, or Gen X, at 34 percent, which would make them approximately 18 to 39 years old. Per Grubb, the average age of someone who plays games is 31 years old (2014). Since badges have origins in the gaming world, the expectation would be that the Gen X and Millennial age groups, which make up 77 percent of the respondents, would have awareness of digital badges, Table 4.2. However, based upon the Gen X and Millennial responses, 40 out of 86 (47 percent) stated they were aware of digital badges; and 46 out of 86 (53 percent) stated they were not aware of digital badges,
Table 4.4. Overall the respondents were not aware of digital badges. Out of the 112 who responded, 59 percent stated they were not aware of digital badges and 41 percent stated they were aware of digital badges, Table 4.4.

<table>
<thead>
<tr>
<th>Table 4.2 Respondents by Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Baby Boomers 1946-1965</td>
</tr>
<tr>
<td>Gen X 1965-1976</td>
</tr>
<tr>
<td>Millennial 1997-1997</td>
</tr>
<tr>
<td>Gen 2020 After 1997</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

A majority of the respondents held some type of higher education degree (62 percent). Out of those holding a formal degree, a majority held a Bachelor Degree with 44 out of 112 (39 percent), Table 4.3. Based upon this data, in theory, the participants who responded to the online survey value learning and attaining recognition for that learning. A user’s collection of badges is
a visual representation of their experience, expertise, and accomplishments. Much like a resume, it allows a user to advertise what or who they know (Treehouse, 2016).

<table>
<thead>
<tr>
<th>Education</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Grad/GED</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Some college/no degree</td>
<td>16</td>
<td>14%</td>
</tr>
<tr>
<td>Trade, tech, vocational training</td>
<td>23</td>
<td>20%</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>13</td>
<td>12%</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>44</td>
<td>39%</td>
</tr>
<tr>
<td>Master Science/Arts</td>
<td>10</td>
<td>9%</td>
</tr>
<tr>
<td>Doctorate</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Skipped</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total participants</strong></td>
<td><strong>112</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3 Respondents by Education Level
4.2 Categorical Response Analysis Based on Survey Data

Categorical Response Analysis tabulates and summarizes categorical response data, including multiple response data, and calculates test statistics. The strength of the Categorical analysis is that it can handle responses in a wide variety of formats without needing to reshape the data. The data in the initial survey was analyzed in a couple ways: 1) by age and 2) by education level.

The first question asked if prior to the survey, the participant aware of digital badges? Overall by age, the respondents were less aware of digital badges with 59 percent stating no, they were not aware and 41 percent stating yes, they were aware of them, Table 4.4.

Dissecting the data by age for awareness, the largest group of the people who were aware of digital badges fell into the Gen X (1965-1976) with 19 out of 38 (50 percent) stating they were aware, and Millennial (1977-1997) 21 out of 48 (44 percent) were aware as well, Table 4.4. Out of all age groups, however, more were not aware of digital badges than were aware of them.

<table>
<thead>
<tr>
<th>Age</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby Boomer (1946-1964)</td>
<td>19 (76%)</td>
<td>6 (24%)</td>
<td>25 (22%)</td>
</tr>
<tr>
<td>Gen X (1965-1976)</td>
<td>19 (50%)</td>
<td>19 (50%)</td>
<td>38 (34%)</td>
</tr>
<tr>
<td>Millennials (1977-1997)</td>
<td>19 (56%)</td>
<td>21 (44%)</td>
<td>48 (43%)</td>
</tr>
<tr>
<td>Gen 2020 (After 2020)</td>
<td>1 (100%)</td>
<td>0%</td>
<td>1 (1%)</td>
</tr>
<tr>
<td></td>
<td>66</td>
<td>46</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>59%</td>
<td>41%</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.4 Digital Badge Awareness by Age (Continued)

Digital Badge Awareness by Age
(Total participants =112)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gen 2020 (After 2020)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Millenials (1977-1997)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gen X (1965-1976)</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Baby Boomer (1946-1964)</td>
<td>6</td>
<td>19</td>
</tr>
</tbody>
</table>

Awareness by education level, showed those with a Bachelor degree seemed to be more aware of digital badges than those in the other education groups. Only those in the Bachelor degree group actually had more who were aware of digital badges, 23 of 44 at 52 percent, versus 21 at 48 percent, Table 4.5. This was a very slight marginal difference. Education level did not seem to have an impact on whether or not a learner was aware of digital badges.

Table 4.5 Digital Badges Awareness by Education Level

<table>
<thead>
<tr>
<th>Education</th>
<th>Yes</th>
<th>No</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Grad/GED</td>
<td>1</td>
<td>2</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>Some college/no degree</td>
<td>6</td>
<td>10</td>
<td>37.5%</td>
<td>62.5%</td>
</tr>
<tr>
<td>Trade, tech, vocational training</td>
<td>7</td>
<td>16</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>4</td>
<td>9</td>
<td>31%</td>
<td>69%</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>23</td>
<td>21</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Master Science/Arts</td>
<td>4</td>
<td>6</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>Doctorate</td>
<td>1</td>
<td>1</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>65</td>
<td>41%</td>
<td>59%</td>
</tr>
</tbody>
</table>
The participants were asked if after reading the definition provided of a digital badge, what their level of interest would be in earning one for a course or courses taken. Overall (73 or 65 percent) the respondents were either “Very Interested” (28 or 25 percent) or “Somewhat Interested” (45 or 40 percent) in earning a digital badge, Table 4.6.

Table 4.6 Digital Badges Overall Interest Rating

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Interested</td>
<td>28</td>
<td>25%</td>
</tr>
<tr>
<td>Somewhat interested</td>
<td>45</td>
<td>40%</td>
</tr>
<tr>
<td>Neutral</td>
<td>29</td>
<td>26%</td>
</tr>
<tr>
<td>Not Very Interested</td>
<td>5</td>
<td>4.5%</td>
</tr>
<tr>
<td>Not at all Interested</td>
<td>5</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

112
Table 4.6 Digital Badges Overall Interest Rating (Continued)

The data for interest level was then examined by age, which produced a generally positive response by all age groups showing interest by selecting “Somewhat interested” or “Very interested” (65 Percent), Table 4.7.

A more compelling result was examined by removing the learners who were “Neutral” by age. There was only one Gen 2020 person in the study and they responded Neutral as to their interest level. This participant also skipped all questions that would explain the ratings given. Remaining are those who selected “Not very interested” and “Not at all interested” combined at 9 percent, versus “Somewhat interested” “Very Interested” combined at 65 percent. Out those who responded “Somewhat interested” and “Very interested”, which were 73 total, 71 (97 percent) of these participants provided a comment.

The majority of the digital badge interest comments were very positive in citing that a digital badge would provide motivation (5), recognition (28), shows they are a continuous learner (17), and credentials could be validated (5). Some also commented that they still did not understand them very well and wanted to learn more (10), and while still positive through their
interest felt there needed to be more awareness about digital badges and their value. Of the participants who were “Neutral” (29 or 25 percent) on interest level, 10 (34 percent) responded with a comment that centered around that they did not feel they knew enough information or had enough knowledge about digital badges, Table 4.7.

One comment in particular from a participant who responded they were very interested summarized “I feel that it would provide motivation to people in our industry to maintain a certain level of competence by engaging in continuing education”.

Table 4.7 Digital Badges Interest by Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Not at all Interested</th>
<th>Not Very Interested</th>
<th>Neutral</th>
<th>Somewhat Interested</th>
<th>Very Interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby Boomer (1946-1964)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>9 – (36%)</td>
<td>8 – (32%)</td>
<td>8 – (32%)</td>
<td>25 – (22%)</td>
</tr>
<tr>
<td>Gen X (1965-1976)</td>
<td>1 – (3%)</td>
<td>3 – (8%)</td>
<td>11 – (29%)</td>
<td>15 – (39%)</td>
<td>8 – (21%)</td>
<td>38 – (34%)</td>
</tr>
<tr>
<td>Millennials (1977-1997)</td>
<td>4 – (8%)</td>
<td>2 – (4%)</td>
<td>8 – (17%)</td>
<td>22 – (46%)</td>
<td>12 – (25%)</td>
<td>48 – (43%)</td>
</tr>
<tr>
<td>Gen 2020 (After 2020)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>1 – (100%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>1 – (1%)</td>
</tr>
</tbody>
</table>

5 5 29 45 28 112
5% 5% 25% 40% 25% 100%

*Note: There were no Traditionalists (Born in 1945 or before) responding to this survey
Table 4.7 Digital Badges Interest by Age (Continued)

When looking at the interest level by education level to earn a digital badge for a course taken; again for the most part, participants responded that they were either “somewhat interested” or “very interested” (64 percent). Most of the people who responded had attained a Bachelor degree (44), with the next closest, Trade, technical and/or vocational training at 23, and next Some college, no degree at 16, Table 4.8. These groups for the most part, were “Somewhat interested” or “Very interested” in digital badges (72 equaling 74 percent) Table 4.8.
Table 4.8 Digital Badges Interest by Education Level

<table>
<thead>
<tr>
<th>Education</th>
<th>Not at all Interested</th>
<th>Not Very Interested</th>
<th>Neutral</th>
<th>Somewhat Interested</th>
<th>Very Interested</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Grad/GED</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>1 – (33%)</td>
<td>2 – (67%)</td>
<td>3 – (3%)</td>
</tr>
<tr>
<td>Some college/no degree</td>
<td>0 – (0%)</td>
<td>1 – (6%)</td>
<td>2 – (13%)</td>
<td>6 – (38%)</td>
<td>7 – (44%)</td>
<td>16 – (14%)</td>
</tr>
<tr>
<td>Trade, tech, vocational</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>11 –</td>
<td>7 – (30%)</td>
<td>5 – (22%)</td>
<td>23 – (21%)</td>
</tr>
<tr>
<td>training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate Degree</td>
<td>1 – (8%)</td>
<td>0 – (0%)</td>
<td>4 – (31%)</td>
<td>5 – (38%)</td>
<td>3 – (23%)</td>
<td>13 – (12%)</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>3 – (7%)</td>
<td>3 – (7%)</td>
<td>10 – 23%</td>
<td>19 – (43%)</td>
<td>9 – (20%)</td>
<td>44 – (39%)</td>
</tr>
<tr>
<td>Master Science/Arts</td>
<td>1 – (10%)</td>
<td>0 – (0%)</td>
<td>2 – (20%)</td>
<td>6 – (60%)</td>
<td>1 – (10%)</td>
<td>10 – (9%)</td>
</tr>
<tr>
<td>Doctorate</td>
<td>0 – (0%)</td>
<td>(50%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>1 – (50%)</td>
<td>2 – (2%)</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>5%</td>
<td>26%</td>
<td>39%</td>
<td>25%</td>
<td></td>
</tr>
</tbody>
</table>

Note: Out of 112 participants, only 111 participants responded to this question
Comments from those in the Bachelor Degree group were examined. This group consisted of 44 participants. Out of the 44 who responded they had a Bachelor degree and were “Somewhat interested” or “Very interested”, and 21 provided comments. The most comments for these two rankings were centered on validation and tracking (8) and recognition (5). The remaining comments included having a visual representation of skills (3), motivational (3) and interested in badges and want to know more (2). In contrast, 6 were “Not very interested” or “Not interested at all” and their comments categorized as follows: not interested (2), not needed/no value (2), gimmick and should not be in a professional environment (1), and personal interest to improve self and do not want to share scores (1).

The Bachelor Degree participants who were interested in earning a digital badge strongly felt that digital badges provided validation for the credentials achieved wanted to be recognized for achievement and felt that the digital badges offered elements of motivation to earn, with some citing themselves as being a gamer; yet, they also were eager to learn more about them. Those who were not interested, for the most part, could see no value in them. The two Doctorate respondents were split in their interest with one being “Not very interested”, expressing that they did not know what the badge meant or if it is recognizable for employment opportunities; and the other Doctorate respondent being “Very Interested” but providing no feedback.

Out of the seven levels of education to choose from, it is also worthy to note that the respondents who fell into the two lowest educational levels with no institutionalized degree (Trade-technical-vocational and High school graduate or GED) did not have anyone who was “Not very interested” or “Not interested at all”. They were either “Neutral”, “Somewhat interested” or “Very interested”. Evaluating their comments showed that for the most part, those who were “Neutral” were uncertain of the value of digital badges and wanted to learn
more. Those who were “Somewhat interested” or “Very interested” also wanted to know more yet could see value in digital badges using words such as recognition, achievement and validation.

Two questions on the survey focused on perceived value by the earner and are as follows: “What is your perceived value of having a digital badge to display?” and “What is your perceived value of a course where you can earn a digital badge?”. These two questions focus on their perceived value of a course with a digital badge and for them to have a digital badge to display. Both of these questions were examined by age and by education level.

Out of 110 who responded to this question by age, 70 or 65 percent felt that having a digital badge to display was “Somewhat valuable” or “Very valuable”, Table 4.9. There were 84 respondents in the Gen X and millennial age group combined. Out of those groups combined, 53 out of the 84 (63 percent) felt that having a digital badge to display was “Somewhat valuable” or “Very valuable”. While these were the larger age groups to note, the Baby Boomers totaled 24 with only one Gen 2020 and no Traditionalist. Out of the 24 Baby Boomers, 17 or 71 percent fell into the “Somewhat valuable” or “Very valuable” group, Table 4.9.
In analyzing the responses who thought that having a digital badge to display was
“Somewhat valuable” or “Very valuable” by education level, Table 4.10, it was noticeable that
all education levels were 61 percent or greater to find value except for those in the Doctorate or
Masters education level who were at 13 percent or less.
Table 4.10 Digital Badges Value to Display by Education Level

<table>
<thead>
<tr>
<th>Education</th>
<th>Not at all Valuable</th>
<th>Not Very Valuable</th>
<th>Neutral</th>
<th>Somewhat Valuable</th>
<th>Very Valuable</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Grad/GED</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>1 – (33%)</td>
<td>2 – (67%)</td>
<td>3 – (3%)</td>
</tr>
<tr>
<td>Some college/no degree</td>
<td>0 – (0%)</td>
<td>1 – (6%)</td>
<td>2 – (13%)</td>
<td>7 – (44%)</td>
<td>5 – (31%)</td>
<td>15 – (14%)</td>
</tr>
<tr>
<td>Trade, tech, vocational training</td>
<td>1 – (4%)</td>
<td>1 – (4%)</td>
<td>7 – (30%)</td>
<td>11 – (48%)</td>
<td>3 – (13%)</td>
<td>23 – (21%)</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>1 – (8%)</td>
<td>0 – (0%)</td>
<td>3 – (23%)</td>
<td>7 – (54%)</td>
<td>1 – (8%)</td>
<td>12 – (12%)</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>4 – (9%)</td>
<td>4 – (9%)</td>
<td>9 – (20%)</td>
<td>23 – (52%)</td>
<td>4 – (9%)</td>
<td>44 – (39%)</td>
</tr>
<tr>
<td>Master Science/Arts</td>
<td>1 – (10%)</td>
<td>2 – (20%)</td>
<td>2 – (20%)</td>
<td>4 – (40%)</td>
<td>1 – (10%)</td>
<td>10 – (9%)</td>
</tr>
<tr>
<td>Doctorate</td>
<td>0 – (0%)</td>
<td>1 – (100%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>1 – (2%)</td>
</tr>
</tbody>
</table>

| Totals                                       | 7                   | 9                  | 23                  | 53                  | 16                | 108                |

Note: Three people did not respond to this question; one person did not provide education level; only 3 participants are at the Masters or Doctorate education level
Out of the 85 who responded who were either Gen X or Millennial, 51 total or 60 percent, felt that a course that had a digital badge would be of value, Table 4.11. Baby Boomers were only 22 percent of the total at 24, yet over half (15) or 63 percent felt that a course that had a digital badge would be of value.

Table 4.11 Digital Badges Value of Course to Earn Digital Badge by Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Not at all Valuable</th>
<th>Not Very Valuable</th>
<th>Neutral</th>
<th>Somewhat Valuable</th>
<th>Very Valuable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby Boomer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1946-1964)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>9 – (38%)</td>
<td>10 – (42%)</td>
<td>5 – (21%)</td>
<td>24 – (22%)</td>
</tr>
<tr>
<td>Gen X</td>
<td>1 – (3%)</td>
<td>3 – (8%)</td>
<td>13 – (32%)</td>
<td>11 – (30%)</td>
<td>10 – (27%)</td>
<td>37 – (34%)</td>
</tr>
<tr>
<td>(1965-1976)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millennials</td>
<td>3 – (6%)</td>
<td>2 – (4%)</td>
<td>16 – (42%)</td>
<td>19 – (39%)</td>
<td>16 – (32%)</td>
<td>58 – (52%)</td>
</tr>
<tr>
<td>(1977-1997)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gen 2020</td>
<td>0 – (0%)</td>
<td>(100%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>1 – (1%)</td>
</tr>
<tr>
<td>(After 2020)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Two people did not respond to this question*
In analyzing the responses who perceived the value of a course where a digital badge can be earned was “Somewhat valuable” or “Very valuable” by education level, Table 4.12, it was noticeable again that all education levels were above 50 percent or greater to find value except for those in the Doctorate or Masters education level, who were at 15 percent or less.

**Table 4.12 Digital Badges Value of Course to Earn Digital Badge by Education**

<table>
<thead>
<tr>
<th>Education</th>
<th>Not at all Valuable</th>
<th>Not Very Valuable</th>
<th>Neutral</th>
<th>Somewhat Valuable</th>
<th>Very Valuable</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Grad/GED</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>1 – (33%)</td>
<td>2 – (67%)</td>
<td>3 – (3%)</td>
</tr>
<tr>
<td>Some college/no degree</td>
<td>0 – (0%)</td>
<td>1 – (6%)</td>
<td>2 – (13%)</td>
<td>7 – (44%)</td>
<td>5 – (31%)</td>
<td>15 –  (14%)</td>
</tr>
<tr>
<td>Trade, tech, vocational training</td>
<td>0 – (0%)</td>
<td>1 – (4%)</td>
<td>10 – (43%)</td>
<td>9 – (39%)</td>
<td>3 – (13%)</td>
<td>23 – (21%)</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>1 – (8%)</td>
<td>0 – (0%)</td>
<td>4 – (31%)</td>
<td>5 – (38%)</td>
<td>3 – (23%)</td>
<td>13 –  (12%)</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>2 – (5%)</td>
<td>3 – (7%)</td>
<td>15 – (34%)</td>
<td>14 – (32%)</td>
<td>10 – (23%)</td>
<td>44 – (39%)</td>
</tr>
<tr>
<td>Master Science/Arts</td>
<td>1 – (10%)</td>
<td>0 – (0%)</td>
<td>3 – (30%)</td>
<td>4 – (40%)</td>
<td>2 – (20%)</td>
<td>10 – (9%)</td>
</tr>
<tr>
<td>Doctorate</td>
<td>0 – (0%)</td>
<td>1 – (50%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>1 – (1%)</td>
</tr>
</tbody>
</table>

Note: Two people did not respond to this question; and one person did not provide education level; only 3 participants are at the Masters or Doctorate education level.
Individual comments were mixed about why learners chose the rating they did. Some felt that while the digital badge could have some value, there was a condition attached. They used words such as “depends”, “low awareness” and “do not see how”. This is especially important to call out as when you compare this to overall awareness by age of digital badges, participants were less aware of digital badges with 59 percent stating they were not aware of them and 41 percent they were aware, Table 4.4. Their comments could be caused by low awareness and not understanding how digital badges work.

While it is important to know the interest level and value perception of a digital badge or a course with a digital badge, it really comes down to if the learner who earned the digital badge, would display it. Displaying the digital badge provides a learner recognition, validation and it is motivational to other learners to see the digital badge displayed as they are potential earners who view the badge of a co-worker, peer or other. If the earner does not display the badge, they
quickly take the issuer and observer out of the equation to participate as it relates to badge value.

The data was viewed by age and education level. For the most part, by age and education, respondents were “Somewhat likely” or “Very Likely” to display the digital badge earned.

Most participants fell into the Millennial, Gen X age groups followed closely followed by the Baby Boomers. With that said, all three age levels were at 54 percent or greater who said they would display a digital badge on a social website or digital enabled source such as a digital resume, Table 4.13.

| Table 4.13 Display Digital Badge Earned on Website or Digital Source by Age |
|---|---|---|---|---|---|---|
| Age | Not at all Likely | Not Very Likely | Neutral | Somewhat Likely | Very Likely | Total |
| Baby Boomer (1946-1964) | 1 – (4%) | 4 – (17%) | 4 – (17%) | 6 – (25%) | 9 – (38%) | 24 – (22%) |
| Gen X (1965-1976) | 3 – (8%) | 4 – (11%) | 10 – (27%) | 9 – (24%) | 11 – (30%) | 37 – (34%) |
| Millennials (1977-1997) | 3 – (6%) | 5 – (11%) | 13 – (15%) | 9 – (28%) | 19 – (40%) | 47 – (43%) |
| Gen 2020 (After 2020) | 0 – (0%) | 1 – (100%) | 0 – (0%) | 0 – (0%) | 1 – (0%) | 1 – (1%) |
| | 7 | 14 | 21 | 28 | 39 | 109 |
| | 6% | 13% | 19% | 26% | 36% |

Note: Out of 112 participants, only 109 participants responded to this question
All education level groups were at 53 percent or higher in that they would display the digital badge they earned on a social website or a digitally enabled source such as a digital resume. However, interesting to note is that the higher education respondents, Doctorate and Masters, who were low in finding value in a digital badge or a course with a digital badge, are the groups highest in that they would display a digital badge earned, Table 4.14.
Table 4.14 Display Digital Badge Earned on Website or Digital Source by Education Level

<table>
<thead>
<tr>
<th>Education</th>
<th>Not at all Likely</th>
<th>Not Very Likely</th>
<th>Neutral</th>
<th>Somewhat Likely</th>
<th>Very Likely</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Grad/GED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college/no degree</td>
<td>1 – (33%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>0 – (0%)</td>
<td>2 – (67%)</td>
<td>3 – (3%)</td>
</tr>
<tr>
<td>Trade, tech, vocational training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate Degree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master Science/Arts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctorate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Out of 112 participants, only 109 participants responded to this question; only 3 participants are at the Masters or Doctorate education level
Out of the 112 people who responded to the survey, 103 provided feedback on the type of digital badge they would like to earn. Four choices were offered: 1) For a product or system at the company I work for; 2) For a specific topic/skill required at the company I work for; 3) One that is recognized by an industry, compliance entity, or formal/informal organization; and 4) Other (learner was then asked to provide information on “other”). The respondent was able to select, one, all or none of the responses.

Out of the 103 who responded, the largest group selected was at 82 percent responding that they would be interested in earning a digital badge that is recognized by an industry, compliance entity, or formal/informal organization. Next, was at 65 percent “For a specific topic/skill required at the company I work for”. And very closing following in third, 62 percent, for most desired would be a digital badge “For a product or system that is at the company I work for”. Last, was “Other” at 6 percent. Out of the six respondents who selected other, all six provided supporting information. Two responded “None at all”; one responded “Future education”; one responded “Certified courses”; one responded “Training, job growth and personal satisfaction”; and one responded “All of the above selections with a physical certificate issued with the digital badge”, Table 4.15.

Interesting to note about this question is that 103 out of the 112 choose to respond. Two responded; however commented negatively, resulting in 101 or 92 percent out of 112 providing a positive response by selecting a digital badge they would be interested to earn. Based on the high percentage of respondents to a type of badge they would like to earn, this is a optimistic indicator there is interest in digital badges and belief they provide value.
Table 4.15 Digital Badges Types of Digital Badges Interested to Earn

<table>
<thead>
<tr>
<th>Types of Digital Badges</th>
<th>Totals</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product/system that's at company I work for</td>
<td>66</td>
<td>62%</td>
</tr>
<tr>
<td>Specific topic/skill required at company I work for</td>
<td>69</td>
<td>65%</td>
</tr>
<tr>
<td>One recognized by industry, compliance, or formal/informal organization</td>
<td>87</td>
<td>82%</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>6%</td>
</tr>
</tbody>
</table>

Note: Out of 112 participants, only 106 participants responded to this question
Note: Respondents could select more than one

Online Survey Summary

The overall results of the online survey suggest that potential earners of digital badges are interested in earning them, 65 percent were somewhat or very interested. They also, for the most part, see value in the digital badge itself and value courses that offer digital badges. This is primarily apparent in that over 90 percent responded to a suggested type of digital badge they would like to earn. However, there is hesitation in that the earners are not clear on how the digital badge works, if observers would recognize and accept them. The hesitation by
participants seems to be again centered round not completely understanding how digital badges work and also due to the fact there are not many in the marketplace that someone in a manufacturing environment can earn. This in large part is due to the fact that digital badge programs in general have not demonstrated their value to be an electronic alternative to paper-based certificates. Issuers are still discovering how to use them to be a strong educational achievement recognition and communication platform. Observers are not necessarily looking for digital badges in general or recognize what the icon represents. Last, earners are not yet earning and/or displaying them to represent or benefit any of the three participants to the digital badge equation.

4.3. Results from the Follow-Up Survey

After launching and analyzing the initial online survey, a second survey process was initiated that focused on three central questions: 1) “How likely is it that you would recommend a course with a digital badge to a friend or colleague?”; “You are a learner who could potentially earn a digital badge by taking a course that offered one. What is your biggest concern and / or curiosity about digital badges?”; and “On a scale of zero to ten with ten being extremely likely and one being not at all, how likely is it that you would sign up for a course with a digital badge over the same course without one?”. These questions were posed after the initial online survey to better understand the likelihood that they would not only recommend a course with a digital badge but also if they themselves would sign up for a course with a digital badge. Additionally, a question was asked to better understand concerns and/or curiosities about digital badges. Out of 33 people agreeing to be contacted, a follow-up survey was held with 12 participants.
The first question asked was “How likely is it that you would recommend a course with a digital badge to a friend or colleague?” which is termed the “Ultimate Question” and tied to a “Net Promoter Score”. The Ultimate Question, while a book written by Fred Reichheld (2006), doubles as a question that has one goal, and that is to determine customer loyalty. The ultimate question turned out to be the one question that could be asked on a survey that helped companies determine that loyalty. “We realized that two conditions must be satisfied before customers make a personal referral. They must believe that the company offers superior value in terms that an economist would understand: price, features, quality, functionality, ease of use, and all the other practical factors. But they also must feel good about their relationship with the company. They must believe the company knows and understands them, values them, listens to them, and shares their principles” (Reichheld, 2006, p. 18-24).

While this particular question was not company focused, it did require the participant to think about the features, quality, functionality, ease of use and other practical factors for digital badges. The results were as follows: 25 percent (3) rated a 9-10 that they would recommend a course with a digital badge to a friend or colleague. “Promoters, as we have seen, are loyal enthusiasts who keep buying from a company and urge their friends to do the same” (Reichheld, 2006). Promoter group is an indicator of growth as it indicates customers are loyal to your brand/company and will come back to your company exclusively.

Next, 42 percent rated this question at 7 or 8, which falls into the “Passive” group. “Passives are satisfied but unenthusiastic customers who can be easily wooed by the competition” (Reichheld, 2006). The results for this group were 42 percent or (5) rated a 7-8 that they would recommend a course with a digital badge to a friend or colleague.
Last, 40 percent rated this question a 6 or less, which is a “Detractor”. “Detractors are unhappy customers trapped in a bad relationship” (Reichheld, 2006). The results for this group were 33 percent (4) rated a 6 or less. Once it is determined how many “Promoters”, “Passives”, and “Detractors”, a “Net Promoter Score” can be determined. The calculation is Promoters minus Detractors equal the Net Promoter Score. The Net Promoter Score for this survey is -8, Table 4.16.

<table>
<thead>
<tr>
<th></th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detractors (0-6)</td>
<td>4</td>
</tr>
<tr>
<td>Passives (7-8)</td>
<td>5</td>
</tr>
<tr>
<td>Promotors (9-10)</td>
<td>3</td>
</tr>
<tr>
<td>Net Promoter Score</td>
<td></td>
</tr>
</tbody>
</table>

*Question: How likely is it that you'd recommend a course with a digital badge to a friend or colleague?*

Next, the participant was asked about their biggest concern and/or their biggest curiosity regarding digital badges. First, there were seven concerns. Those concerns focused on how
secure the digital badge is with all the credentials tied to it; how widely accepted the digital badge would be; and if the instructor would also have the digital badge. However, the one concern that was most noted is if the digital badge had value by being accepted and recognized across multiple businesses and organizations. Four of the respondents had no concern citing that they liked the idea of digital badges, felt that they provide recognition and motivation to achieve, establish a sense of pride for the earner to display and shows that the earner has that expertise represented by the digital badge. Only one person expressed a curiosity citing that they wanted to better understand how they worked.

The last questions focused on how likely it would be that the participant would sign up for a course with a digital badge over the same course, which did not offer one. Over half of the participants, 58 percent, rated a 7 or above, that it would be extremely likely they would pick the course with the digital badge; 2 rated this question a 5 being somewhat neutral; and three were at 1 and 2, respectively, that it would be unlikely that they pick a course with a digital badge over another course.

| Table 4.17 Digital Badges Sign Up for Course with Digital Badge Versus One Without |
|------------------------------------------|----------|
| Detractors (0-6)                        | 5        |
| Passives (7-8)                          | 2        |
| Promotors (9-10)                        | 5        |
| **Totals**                              | **42%**  |

*Question: How likely is it that you'd sign up for a course with a digital badge versus one without?*
Table 4.17 Digital Badges Sign Up for Course with Digital Badge Versus One Without (Continued)

<table>
<thead>
<tr>
<th>Digital Badges Sign up for Course with Digital Badge Versus One Without</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promoters (9-10)</td>
</tr>
<tr>
<td>Passives (7-8)</td>
</tr>
<tr>
<td>Detractors (0-6)</td>
</tr>
</tbody>
</table>

Results from the Follow-Up Survey Summary

The follow-up survey produced an interest in and perceived value for digital badges and courses with digital badges with a rating of 58 percent stating it would be likely they would pick a course with a digital badge over one without. This is based on the rating given of eight or ten.

The structured survey results did present an understanding of the concerns that earners have for digital badges and courses with digital badges noting that they are concerned with the security, if they will be recognized across industries and businesses and if, like Continuing Education Units (CEU), they will be accepted by the entity they are showing the digital badge to. Based on this feedback it is imperative that the digital badge program being built by the issuer is well-thought out incorporating incremental accomplishments with nesting of badges for desired and clearly communicated outcomes.

Customer loyalty is extremely important. According to Anchor, “Two new research studies that I have been a part of are shaping our understanding of the impact of using digital
platforms, like social recognition programs, to improve happiness and business outcomes. In short, these two studies suggest that effective digital recognition programs can help scale organic praise, have a high ROI, and lead to significantly higher levels of employee performance and engagement, as well as increased customer loyalty, as measured by net promoter scores” (2016). While the Net Promoter score was -8, it is clear that if there were more successful models available and experiences by the respondents, that likely the promoter score would be positive.
Medals, cloth badges and digital gaming badges have been used over history to honor heroes, recognize accomplishments and motivate an individual’s desire to achieve goals. Digital badges, like paper certificates, represent accomplishment in formal and informal education as well as in business. Digital badges are a new form of these paper-based recognition outputs and have an added value in that the credentials can be tied to the badge electronically and follow the earner. Badging initiatives are predicted to fulfill a growing business need for highly skilled workers by increasing educational equity in order to grow the pool of talent workers available to meet job market demands (Young, 2012).

The credentials for digital badges can be viewed by observers if the earner chooses to display the digital badge through a website or a digital resume. This study suggests that potential earners of digital badges at a manufacturing facility:

1) Do have interest to earn a digital badge, 65 percent were very or somewhat interested;
2) They do consider having a digital badge to display to be of value (65 percent very or somewhat valuable) and that courses with digital badges to be of value (66% were very or somewhat valuable);
3) They would display a digital badge if earned, 61 percent stated somewhat or very likely); and
4) That 92 percent of participants defined a course they would take to earn a digital badge.

The largest group of participants were Millennials, 48 out of 112 (43 percent), with Gen X closely behind at 38 out of 112 (34 percent), and Baby Boomers closely behind Gen X at 25
out of 112 (22 percent), Table 4.2. The largest educational level was Bachelor degree at 44 out of 112 (39 percent), Table 4.3. The research study was guided by the following questions:

1. What is the level of awareness, interest, and value learners have for digital badges;
2. What is the learners perceived value for courses with digital badges; and
3. What is the learner’s willingness to seek out and display digital badges?

The overall results of this study show that regardless of age or education, the earner in general does have interest, (somewhat interested or very interested), in earning a digital badge. They also find value in digital badges and courses with digital badges; and they state that if they earned a digital badge, it is likely, (somewhat likely and very likely), that they would display a digital badge. Additionally, 101 out of the 112 participants, or 92 percent, provided a response for a type of digital badge they would be interested to earn. Based on the high percentage of respondents to a type of badge they would like to earn, indicates there is interest in digital badges and the belief they provide value.

A college career path is a very narrow one, and it is expensive. Everyone should not have to follow the same path, and digital badges have the potential to provide a system for giving credit for doing valuable, marketable things outside of school (Waters, 2013). Digital badges are a new technology to give recognition for an achievement by an authoring entity electronically versus a traditional paper-based certificate recognition. The program or process for the achievement of either form of recognition does not change. The differentiation for the digital badge is that it is digital and can tie all the information for the badge including name, description, criteria, issuer, evidence, date issued, standards and tags.

The data was analyzed categorically looking at responses overall, by age and then by education. Regardless of the category, the results indicate that the respondents have interest, find
value and would display a digital badge. Part of the appeal of digital badges is the wide range of learner motivations that badges might speak to (Beattie, 2014). Two new research studies that Achor (2016) has been a part of suggest that effective digital recognition programs can help scale organic praise, have a high ROI, and lead to significantly higher levels of employee performance and engagement, as well as increased customer loyalty, as measured by net promoter scores. Additionally in order to motivate the adult learner there are six sources of motivation including: social relationships; external expectations; social welfare, personal advancement; escape/stimulation; and cognitive interest (Lieb, 1991). Digital badges have potential to serve as motivation for the adult learner meeting social and personal advancement needs. With the growth of social networks such as Facebook and LinkedIn, where digital badges can be shared, social interactions and personal advancement can be facilitated.

Looking at the results, we first examined the awareness of digital badges, then interest in digital badges and courses with digital badges and last the value for digital badges by learners who could potentially earn the badge. Digital badges are still incredibly new and there are very few published studies evaluating the earner’s awareness, interest level and perception of value for digital badges. Dissecting the data by age for awareness, the largest group of the people who were aware of digital badges fell into the Gen X (1965-1976) with 19 out of 38 (50 percent) stating they were aware, and Millennial (1977-1997) 21 out of 48 (44 percent) were aware as well, Table 4.4. This was due to the fact that the majority of the respondents were in these two categories: Gen X made up 34 percent of total respondents and Millennial made up 43 percent of the total respondents. Out of all age groups, however, more were not aware of digital badges than were aware of them.
Awareness by education level, showed those with a Bachelor degree or Doctorate seemed to be more aware of digital badges than those in the other groups. Only those in the Bachelor degree group actually had more who were aware of digital badges, 23 of 44 at 52.3 percent, versus 21 at 47.7 percent, Table 4.5. Overall, out of all participants more were not aware at 59 percent. Since there was no follow-up question to the participants’ response of yes or no, there is not a logical explanation for this rating.

Learners not being aware of digital badges is not surprising as digital badges still have not reached critical mass. Also, while conducting the follow-up survey, prior to asking the additional questions, each person asked to have digital badges explained to them. As digital badges grow in popularity and there are growing valid and valued examples, good and bad, that can be learned from; and it is expected that based upon the responses seen in this study, awareness of digital badges and how they work need and will continue to grow. This is due to the efforts of Mozilla and MacArthur Foundation in part. It is also due to the fact that digital badges are being presented at conferences such as the Masie annual conference, Learning Solutions and Conference Expo, EDUCAUSE events, to name a few. As noted by Finkelstein et al., there are some notable evolving badge systems that are gaining in industry-wide acceptance: EDUCAUSE, Intel International Science and Engineering Fair, The American Association for State and Local History and the Yale Center for Emotional Intelligence (2013).

Another program that exists is in the finance discipline. Institute of Management Accountants (IMA®) is forging ahead in the movement to offer digital badges to promote career success. Previously, members received medallions for their accomplishments in the IMA Leadership Recognition Program, part of the IMA Leadership Academy (IMALA). Now they will receive digital badges. The five ascending levels of achievement (Pewter, Bronze, Silver,
Gold, and Platinum) are based on amount of service, courses completed, and other criteria (Stone, 2015). It is expected this trend of developing and offering digital badges will lend itself to popularity and growth thus reaching a tipping point in the next two to five years.

The data produced a positive response for interest regardless of examining it by age or education level with 73 percent being “Somewhat” or “Very interested”. Those in this group made comments citing that a digital badge would provide motivation, recognition, and show that they are continuous learners and that credentials could be validated. One comment echoed the sentiment of interest for digital badges by participants “I feel that it would provide motivation to people in our industry to maintain a certain level of competence by engaging in continuing education”.

The value proposition was addressed in evaluating the digital badge itself and then a course with a digital badge. Both of these were rated similarly by respondents regardless of age or education level. For age, “Somewhat” and “Very interested” at 60 percent for a course’s value with digital badge, Table 4.11; and 65 percent, value having a digital badge to display, Table 4.9, respectively. However, there was a higher rating of those who were Neutral by age when it came to perceived value of a course with a digital badge (31 percent), Table 4.11, versus having a digital badge to display by education level (21 percent), Table 4.9. Ratings slightly went up for not seeing value in having a digital badge to display versus being Neutral, which went down, Table 4.9. There appears to be skepticism as to the value of having a digital badge to display. This may be again in part to not having enough knowledge on how digital badges work or with actual digital badge programs. Also, this may be due experiences with other programs that offer a digital badge just for attendance, which dilutes the value of the badge to earn and display.
Out of 112 learners who responded to the original online survey, 101 or 92 percent noted a digital badge they would be interested to earn. Based on the high percentage of respondents to a type of badge they would like to earn, this is a positive indicator there is interest in digital badges.

Most participants for age fell into the Millennial, Gen X age groups followed closely followed by the Baby Boomers. With that said, all three age levels were at 54 percent or greater who said they would display a digital badge on a social website or digital enabled source such as a digital resume, Table 4.13. All education level groups were at 53 percent or higher in that they would display the digital badge they earned on a social website or a digitally enabled source such as a digital resume, Table 4.14. However, interesting to note is that the higher education respondents, Doctorate and Masters, who were low in finding value in digital badges or a course with a digital badge; however, are the groups highest in that they would display a digital badge earned. Not all respondents who had a Masters or Doctorate responded as to why they gave the rating that they did; however, those who did respond either had a concern that the digital badge would not be recognized by others or didn’t find more value in a course just because it offered a digital badge, and did not understand how the digital badge would make a course more or less valuable. These responses lead to conclusions that there is still lack of understanding by an earner of how a digital badge works.

During the follow-up survey, the learner was asked “Would they recommend a course with a digital badge to a friend or colleague”. This particular question was not focused on a specific company or brand; however, it did focus on an outcome of a course, which is the receiving of a digital badge. This question did require the participant to think about the features, quality, functionality, ease of use and other practical factors for digital badges. The results were
as follows: 25 percent (3) rated a 9-10, which is considered to be Promoters who are loyal fans of the company and/or brand. Forty two percent (5) rated this question at 7 or 8, which falls into the Passive group, who are not necessarily dissatisfied; however, they can be easily wooed by someone else, namely the competition. Last, 33 percent (4) rated this question with a 6 or less, which is a “Detractor”. This group is unhappy. The calculation to determine a Net Promoter Score is: Promoter percent minus Detractors percent equals the Net Promoter Score. The Net Promoter Score for this survey is -8, Table 4.16. I don’t believe this is necessarily a negative intention by the learners who responded. If we look at the actual scores, the majority of the ratings were at 5 or above, which based on the Likert scale, five and above is not a negative rating. Three out of the 12 total rated this question low (1 or 2), which means that 25 percent would not likely recommend a course that has a digital badge to a friend or colleague.

The Net Promoter Score is used by companies as a loyalty indicator and can predict growth. While the Net Promotor Score is not positive, the responses are not necessarily negative. If viewed along with the other rating scales used, the outcome appears different: a 9-10 (3) would be “Extremely likely”, 7-8 would be “Somewhat likely” (5), a 5 would be “Neutral” (2), a 3-4 would be “Not Likely” (1), and a 0-2 would be “Not at all likely” (1). This would mean that 67 percent would be “Very or Somewhat likely” to recommend a course with a digital badge to a friend or colleague.

To determine if a learner associated value to a course with a digital badge, learners were asked if they would sign up for a course with a digital badge over one without it. Over half of the participants, 58 percent, 7 rated an 8 or 10 that it would be extremely likely they would pick the course with the digital badge; 2 rated this question a 5 being somewhat neutral; and 3 were at 2 and 1 respectively that it would be unlikely that they pick a course with a digital badge over
Another course. These responses mirror the responses for the Net Promoter Score question. Again, this is a positive indicator of value.

The follow-up survey did present understanding of the concerns earners have for digital badges and of courses with digital badges noting that they are concerned with the security, if they will be recognized across industries and businesses and if similar to Continuing Education Units (CEU), they will be accepted by the entity they are displaying the digital badge to. Based on this feedback it is imperative that the digital badge program being built by the issuer is well-thought out incorporating incremental accomplishments with nesting of badges for desired and clearly communicated outcomes. They also expressed curiosity with their questions of concern and interest to learn more.

Two questions focused on value: 1) “What is your perceived value of having a digital badge to display?”, and 2) “What is your perceived value of a course where you earn a digital badge?”. Respondents saw more value in having a digital badge to display by education level rating “Somewhat valuable” and “Very valuable” which total was collectively 64 percent of total responses and “Neutral” was 21 percent, Table 4.10. However, perceived value for a course with a digital badge that could be earned by age showed an increase in the respondents selecting “Neutral” at 31 percent and a slight decrease in students selecting “Somewhat” and “Very valuable” collectively at 60 percent, Table 4.11. Participants felt that while the digital badge was of value, their value perception dropped or moved to “Neutral” for courses offering a digital badge.

In comparing the two questions that relate to value based on awareness, it’s noted that participants who did not have awareness of digital badges prior to the survey, found more value in having a digital badge to display and in a course that offered a digital badge. Those
participants that stated they were familiar with digital badges prior to the online survey were more Neutral on the value of courses where a digital badge could be earned and thought that having a digital badge to display was Somewhat valuable. The drop from valuable to neutral selection supports statements made by the participants being unsure of how digital badges would work, if they would be recognized in the industry and if others who would be observing them would place equitable value on the digital badge regardless of where earned. Somewhat like Continuing Education Units (CEU), the learners were concerned that if a digital badge would be earned by a company offering them that the digital badge and its value would be recognized by others across industries, educational entities, formal organizations and companies.

Based on all response ratings to the questions, the results suggest that earners, do have interest in digital badges; they do find value in having a digital badge to display; they do find value in a course with a digital badge over one without; they would display a digital badge if earned; they would recommend a course with a digital badge to a friend or colleague; and they would sign up for a course with a digital badge over one without. Digital badges are creating a paradigm shift that could be considered a disruptive innovation, by offering a viable credentialed alternative to paper-based certificates, and to the institutions and entities that offer them.
5.1 Contributions of this Study

Current research on digital badge programs has been limited. There is very little if any research on the perceived awareness, interest and value of and for digital badges for the earner, issuer and observer. This study focuses on the earner as they are the individual who would make the decision to attend a course or enroll in a program with digital badges; they would be the person discerning interest and value to seek out and find digital badges; and they would be the person who would choose to display the digital badge where potential observers could see them. Out of the three parties (issuer, earner, and observer) to a badge transaction, the earner is critical. If the earner does not have awareness, interest or see value in digital badges, they will not seek them out nor pick courses or programs that offer them over ones without.

This study does infer that while earners awareness has not reached critical mass, neither have digital badges disrupting traditional paper-based certificates. Curiosity and interest is present for the adult learner who is the potential earner and is driven by motivation factors such as social interactions and career advancement, which digital badges enable on these digital environments. This study also infers that if the digital badge program is built upon such due diligence as that of Boy and Girl Scout programs, potential earners will seek the digital badge out for attainment and the opportunity to display.

5.2 Implications of this Study

The implications to the current study include it cannot be assumed that just because a digital badge is created for a course, offered for demonstrated competencies by the earner, or is created for a badge program, does not mean that potential earners will flock to earn them. It will require businesses, educational entities and organizations to exercise the mandatory due
diligence when creating digital badge programs that are well thought out and include the essential work to incorporate necessary accreditation so that the badges and programs are recognized and respected across the necessary disciplines.

Digital badges have the ability to disrupt the traditional paper-based certificates handed out for competencies gained from attending class. However, it is essential that the digital badge exercise its capability to provide all the essential information tagged to it including name, issuer, credits, claims, description, date achieved, and date to be renewed (if applicable). This capability goes beyond paper-based certificates in information alone and has the capability to be immediately validated by an observer. As potential earners start experiencing well-thought out digital badging programs by issuers and start displaying them because they find value in them to earn and display, it is likely that observers will start seeking them out and acknowledging this practice to the earner, thus helping digital badges to reach critical mass.
5.3 Limitations of this Study and Further Research

This research focused mostly on those in a large manufacturing company. A larger sample that is a cross-section of business functions, such as finance, human resources, and technology, rather than only manufacturing, could be a desired next step. In doing so, understanding a broader audience could be evaluated.

Another limitation is the actual literature including successful digital badging programs, and research on the other parties to a badge transaction: issuer and the observer. Digital badges have not reached a critical mass and it is important to continue to monitor programs from educational institutions, organizations and business entities to glean examples that are successful, and also ones that may fail. There is much to learn from failures. It takes time, resources and budget to develop the type of programs that have broad recognition and meaningful competency attainment for each badge, like the Boy Scouts Eagle Scout program. The more programs that are available and that can be studied, for success, may drive growth for educational institutions, business and organizational entities that replicate the success points of those programs.

Digital badges are still trending upward and future programs and research of those programs is needed to further understand impact and value. Future research will include implementing and evaluation a preliminary program for offering digital badges with courses and enabling assessment of knowledge and skills for those who have the desired competencies without taking the course. This will include incorporating industries and educational institutions to ensure the program is recognized broadly beyond the company offering the education. Higher education institutions are collaborating with a greater number of diverse partners, including some that are not in the traditional education space. More emphasis by higher education is being placed on preparing students for the world of work, and this is driving some of the collaboration. Increased emphasis is on outreach for educational institutions and is included in strategic plans
specifically to industry partnerships (Thayer & Lowendahl, 2016). If higher education credits are diminished by accreditation, then the education ecosystem may be disrupted; and traditional educational institutions will need to restructure credits. It would be worthwhile that higher education institutions start to figure out how to issue and revoke digital badges equivalent to existing certificates and diplomas; and learn how new forms of externally earned credentials will be accepted, accounted for and honored in their systems.

Like the Boy Scout badging program, due diligence will need to be exercised to deliver a program that the potential earner will see as valuable. The value will come from the course itself producing the desired outcomes, the recognition of the digital badge that is tied to the course offering the credentialing information for an earner to display and an observer to see, and the broad recognition of the digital badge and educational program by industries, educational institutions, organizations and businesses.

It will be most important to partner with industry, educational institutions and other recognized organizations to deliver on a digital badging program. Thayer and Lowendal, (2016) state that “Digital business is driving change to business models in all industries, including higher education. These changes are often catalyzed by the breaking down of traditional boundaries surrounding the academy. The result is a more fluid business environment that extends the value chain to the larger education ecosystem” (p. 13). This means that educational institutions are recognizing that an impending disruptive change is in progress. Reinvention of credits for businesses will have greater impact on educational institutions who are trying to prepare students for work life. Digital badges offer ways for earners and observers to match jobs and skills.
Because digital badges are a visual emblem representing achievement, they present an opportunity for those offering them to be easily promoted and ultimately recognized. Developing digital badge programs is part of the digital evolution. People, who do not find the complexity of the digital era and constant updates in the field of technology problematic, are generally referred to as “Digital Natives”. Digital natives are today’s young people who were born into the digital era and are growing up exposed to the continuous flow of digital information (Dinglil & Seychell, 2015). Digital badges are just an extension of the digital environment that digital natives do not find difficulty with and accept the changing landscape as normal evolution.
REFERENCES


Retrieved from http://gartner.com


doi:10.1080/07380569.2014.890879


APPENDIX A - TARGET AUDIENCE EMAIL PLUS CONSENT

Subject: Account Validation – Please read

You’ve received this email because you are registered learner on LMS SYSTEM. If you’re reading this email, it establishes that your account is ACTIVE and nothing is required of you.

In addition, you’re invited to participate in a survey on the topic of digital badges.

If you agree to be part of this study, which will take a very minimal amount of your time, please do the following:

1) Read the Consent Form; then
2) Click on the link below to access the online survey and follow the instructions
3) Thank you in advance for your consideration and time to participate in this research!

Sincerely,

Educational Services

DIGITAL BADGE RESEARCH CONSENT

What the study is about: The purpose of this study is to learn what your level of interest is and how you feel about being offered and earning digital badges for courses you’d take from an educational entity.

What we will ask you to do: If you agree to participate, a link to an online survey follows below. You’ll click the link, read a definition of digital badges, and answer a series of questions on the topic of digital badges. It will take approximately 5-15 minutes to complete the survey.

Risks and benefits:
There are no anticipated risks for you to participate in this study. No information, such as email address, name, company name, etc. will link you to your responses. There are no benefits to you at this time other than the opportunity to participate.

Compensation:
There is no compensation for completing this survey.

Your answers will be confidential.
The records of this study will be kept private. In any sort of report that is made public, there will not be any information that would make it possible to identify you or the company you work for.

Taking part is voluntary:
Taking part in this survey is completely voluntary. If you decide to take part, you are free to withdraw at any time and answer only the questions that you want to answer.
If you have questions: The primary researcher conducting this survey is Sandra Schwarz of Educational Services. If you have questions, you may contact Sandra anytime at: cellphone 641-691-0898 or cellphone 515-868-2877, land line 641-754-2837.

Participant Statement of Consent: I have read the above information, and have received answers to any questions I have. I consent to take part in the study by clicking on the survey link provided and completing the survey.

Thank you for your consideration to participate.

CLICK SURVEY LINK BELOW TO PARTICIPATE:

https://www.surveymonkey.com/r/xxxxxxxxx-DigitalBadges
APPENDIX B - DIGITAL BADGES DEFINITION

Traditional physical badges have been used for many years by various organizations such as the Boy and Girl Scouts of America to give members a physical emblem to display the accomplishment of various achievements, such as how to start a fire.

Digital badges are “a symbol or indicator of an accomplishment, skill, quality or interest. Badges have been successfully used to set goals, motivate behaviors, represent achievements and communicate success in many contexts. A digital badge is an online record of achievements, tracking the recipient’s communities of interaction that issued the badge and the work completed to get it”, Mozilla Wiki (2014).

Digital badges are developed online and have trackable credentials connected to them. They appear in the form of an image that is recognizable to those seeking a person with the skills and knowledge identified by the badge and the earners who choose to display them. They can be displayed on digital resumes, job sites, and social media sites such as LinkedIn, Facebook and even company tracking systems.

(Company name) views digital badges as a way to give recognition for the knowledge, skills and competencies of the learner’s prior knowledge and experience and also through (Company name) and industry courses completed for expertise acquired for particular skills and product knowledge.

One of the most notable benefits of a displayed badge by an earner is that the badge is linked back to the issuer that verifies the accomplishments.

Now rather than being a Boy or Girl Scout wearing a sash with your badges sewn onto it, you can have digital badges connected to a variety of websites that can be seen by whoever you choose to share the badge with.

REFERENCES

APPENDIX C - ONLINE SURVEY

This survey is to evaluate interest levels in and perceived value for digital badges and courses with and without them. While it is important you answer each question, you may choose to skip questions. Thank you for participating as your feedback is important.

DIGITAL BADGE DEFINITION

Digital Badges are an emerging electronic technology appearing as a graphic representation as of form of recognition of an individual's knowledge and skills. At their most basic level, digital badges are a new way to capture and communicate what an individual knows and can demonstrate. (Finkelstein, Knight, Manning, 2013). Digital badges came out of the gaming world. The digital nature of them makes the issuing source, criteria to earn, evidence of earning, a date and its expiration, along with the earners name, displayable by the earner, discoverable by the observer, and create opportunity to reach new audiences and provide learning opportunities that can be recognized by the issuer. Digital badges recognize learning and successes and are used as motivation to participate as a visual display representing evidence of achievement of learning objectives.

Resource

1. What is your gender?

Female Male

2. When were you born? (select one)

Pre 1946 Traditionalist
1946-1964 Baby Boomer
1965-1976 Gen X
1977-1997 Millennial
After 1995 Gen 2020

3. What is the highest level of education you have completed? (select one)

Some high school, no diploma
High school graduate, diploma or equivalent such as GED
Some college, no degree
Trade, technical and/or vocational training
Associate degree
Bachelor degree
Master Science/Arts
Doctorate
4. Prior to this survey, were you aware of digital badges? (select one)
   Yes  No

5. After reading the definition of a digital badge initially provided, what would be your level of interest in earning a digital badge for a course or courses taken? (select one)
   Very interested
   Somewhat interested
   Neutral
   Not very interested
   Not at all interested

6. What is the reason for the rating given in the above answer? (the content box requires a response)
   <Open entry content box>

7. What is your perceived value of having a digital badge to display? (select one)
   Very valuable
   Somewhat valuable
   Neutral
   Not very valuable
   Not at all valuable

8. What is your perceived value of a course where you earn a digital badge? (select one)
   Very valuable
   Somewhat valuable
   Neutral
   Not very valuable
   Not at all valuable

9. What is the reason for the rating given in the above answer? (the content box requires a response)
   <Open entry content box>

10. What type of digital badges would you be interested in earning if available to you as an adult learner?
    (select all that apply)
    For a product or system that's at the company I work for.
    For a specific topic/skill required at the company I work for.
    One that is recognized by an industry, compliance entity, or formal/informal organization
11. How likely is it you would display a digital badge earned on a public or social website and/or a digital enabled source such as a digital resume? (select one)

- Very Likely
- Somewhat Likely
- Neutral
- Not Very Likely
- Not at all Likely

12. What is the reason for the rating given in the above answer? (the content box requires a response)

<Open entry content box>

Thank you for your responses to this survey. We'd value gathering more information from you. If you agree to be contacted for additional information and be part of a customer advocacy group, please make the appropriate selection below and enter your contact information.

I agree to be contacted for additional information gathering
I do not want to be contacted

**First Name**
**Phone Number you can be reached at**

Contact Information
Please provide a day of the week and time that you can be contacted

Thank you very much for your time and responses to this survey.
APPENDIX D - DEMOGRAPHIC CHARACTERISTICS

**Gender**
Male
Female

**Age**
- Born 1900-1945
- Born 1946-1964
- Born 1965-1976
- Born 1977-1997
- Born after 1997

**Education**
- Some high school, no diploma
- High school graduate, diploma or the equivalent (for example: GED)
- Some college credit, no degree
- Trade/technical/vocational training
- Associate degree
- Bachelor’s degree
- Master’s degree
- Professional degree
- Doctorate degree
APPENDIX E - SCRIPT AND FOLLOW-UP SURVEY

Participant does not answer.
(Leave message:  This is Sandra and I’m the primary researcher who sent you the email for digital badges. You responded to the initial survey and stated you’d be willing to provide additional information. If this is still true, please contact me during the day or evenings Central Standard Time, at 641-691-0898. Thank you and I look forward to visiting with you. (The participant was not contacted further by the researcher).

Participant answers.
Good Morning, (Afternoon), (Evening).

This is Sandra and I’m the primary researcher who sent you the email for digital badges. You responded to the initial survey stating that you’d be willing to provide additional information. Is now a good time for me to visit with you?

No (determine a date/time to call participant back)
Yes (continue)

Great! I would like to ask you additional questions about digital badges. Before I ask, do you have any questions for me regarding digital badges or this survey that I can answer for you?

Yes (answer questions)
No (continue)

I’m going to ask three questions. If at any time you do not want to answer a question, you don’t need to and can say so. You also can stop the survey at any time. Let’s start with the first question.

1) On a scale of zero to ten, with ten being extremely likely and one being not as all likely, how likely is it that you would recommend a course with a digital badge to a friend or colleague?

2) You are a learner who could potentially earn a digital badge by taking a course that offered one. What is your biggest concern and / or curiosity about digital badges”

3) On a scale of zero to ten with ten being extremely likely and one being not at all, how likely is it that you’d sign up for a course with a digital badge over the same course without one?

Thank you very much for you time and input to this research.
APPENDIX F - EXEMPT FORM IRB

APPENDIX F - EXEMPT FORM IRB

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
139 Pearson Hall
Ames, Iowa 50011-1207
515-294-9386
FAX 515-294-2107

Date: 1/19/2016
To: Sandra Schwarz
N106 Legomarcino
CC: Dr. Ana-Paula Correia
N105B Legomarcino Hall

From: Office for Responsible Research
Title: Factors of Digital Badge Adoption: Perceived value of courses with and without digital badges
IRB ID: 16-007
Study Review Date: 1/19/2016

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where
  - Information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects; or
  - Any disclosure of the human subjects' responses outside the research could not reasonably place the subject at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

The determination of exemption means that:

- You do not need to submit an application for annual continuing review.

- You must carry out the research as described in the IRB application. Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

- Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

- Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Human Subjects will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. Only the IRB or designees may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

Please be aware that approval from other entities may also be needed. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.

Please don’t hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.