Impact of Digital Badging on Faculty-Student Mentoring Program a Quantitative Study

Kristina Harb

New Jersey City University Educational Technology Leadership Program

EDTC 806 – Research Methods in Education Technology Leadership

Dr. Christopher Carnahan

March 15, 2021

Table of Contents

Chapter 1: Introduction

Introduction

Gamification has been widely adopted in higher education to make content more attractive and increase user engagement. To achieve these objectives, the emergence of new teaching and learning models has encouraged educators, as social actors, to adapt to learners' needs to create conditions suitable for developing more motivating and innovative practices (Campillo-Ferrer et al., 2020). Gamification allows educators to incorporate game elements into a learning environment to help learners acquire knowledge more quickly and fluidly.

Digital badging, a form of gamification, has been a fast-growing trend in higher education due to technological advances. Digital badges are a symbol or indicator of an accomplishment, skill, quality, or interest (Dyjur & Lindstrom, 2017). Digital badges have been implemented in higher education to set goals, motivate behaviors, represent achievements, and communicate success. Metadata is embedded into the digital badges, which have information about the issuing institution's name, the date issued, and criteria for earning the badge (Fields, 2015). Digital badges are a visual record of achievement and can be shared through social media and professional networking sites.

Higher educational institutions have incorporated digital badging into faculty-student mentoring programs. Mentorship is a professional, working alliance in which individuals work together over time to support the personal and professional growth, development, and success of the relational partners through the provision of career and psychosocial support (Byars-Winston, & Dahlberg, 2019). Mentoring has played an essential role in developing science, technology, engineering, and mathematics (STEM) professionals. Clarion University, located in rural west-

central Pennsylvania, implemented a digital badging system into their faculty-student mentoring program. A student who completes all five areas composed of career readiness and mentoring modules resulted in a digital badge and was eligible to participate in the faculty mentor program. This requirement has ensured that their students are professionally prepared and responsible to engage with faculty mentors.

Statement of the Problem

Student preparedness and engagement in faculty mentoring programs are ongoing issues. Utilizing student feedback from focus groups helped to understand student's perception of services offered to be dull. The program at Clarion University sought to attract and motivate students to use the faculty-student mentoring program. Not only was the goal to encourage and attract more students, but they needed to create a culture shift that focused on engaging students early, often, and throughout their entire college career.

The implementation of a digital badging system with a faculty mentoring system has shown a positive impact. Continuing to study the effects of digital badging on a faculty-student mentor program can bridge the significant data gaps. There is little information on how digital badging impacts academic performance, internal and external internship placement, and student attitudes toward career readiness and graduation.

Purpose

This quantitative study aims to explore the impact of a digital badging system in a faculty-student mentor program. The researcher will collect data from college-level STEM students to see if there is a relationship between the number of digital badges earned and their grade point average (GPA). This study will also investigate the relationship between college-level STEM students with a faculty mentor who earns digital badges and could secure

internal/external internship opportunities. Finally, the study will highlight the impact digital badging has on college-level STEM students' attitudes towards career readiness and graduation.

Research Questions

The research questions that will help guide this quantitative study are as follows:

RQ1: What is the relationship between the number of digital badges a college-level STEM student mentee earns and their grade point average (GPA)?

RQ2: What percentage of college-level STEM students with a faculty mentor who earn digital badges secure internal/external internship opportunities?

RQ3: What is the relationship between digital badging and college-level STEM student attitudes towards career readiness and graduation?

Chapter 2: Literature Review

Introduction

Digital badging continues to grow traction in higher education. Digital badging is a way for students to acknowledge achievement and various qualifications in specific skills and content. While digital badging is increasing in popularity, research continues to develop standards to ensure consistency with the implementation and recognition of skills. An analysis of the varying factors impacting performance and adoption could better help understand the unique nuances related to badge implementation and establish consistency among badge design standards. (Stefaniak & Carey 2019).

Various uses and reasons for implementing digital badging in higher education are highlighted in this literature review. Digital badging has been shown to improve intrinsic and extrinsic motivation. Digital badging can also be referred to as micro-credentials and offer opportunities to showcase professional development. Badging has been applied to course-based and program initiatives such as first experience courses and mentoring programs. Research has established the positive impacts of using gamification through digital badging on students in higher education.

Motivation

Gamification is a strategy used in higher education for increasing engagement by incorporating game elements into an educational environment (Dichev & Dicheva 2017). Students become stimulated by the effects that game elements can produce. Research explores gamification's influence in educational settings with favorable feedback such as the increase of engagement, user retention, and knowledge. Abramovich and Wardrip (2016) consider badges as a powerful, positive tool used to motivate students. Badges and external reward mechanisms can

be used to positively reinforce and stimulate students' behavior. By informing students of the types of digital badges before the learning activities, it can also increase their motivation (Zhou et al., 2019). Badges with points and leader boards can be a gamification element that enables learners to compete with themselves or others. Gamification increases students' engagement and motivation to learn, and which can fuel their ambitions for success. These opportunities create a stimulating and competitive environment in which students will actively participate.

Micro-credentialing and Professional Development

Digital badging offers students and employees opportunities for micro-credentialing and professional development. Virtual credentialing systems allow students and employees to showcase newly acquired skills and mastery of recently learned content. Many employers issue badges on various platforms to recognize their employees' skills and accomplishments. Micro-credentials may be attractive to students because of the gamification of skills acquisition (Mathur et al., 2018). Micro-credentialing programs are well received by both students and faculty. Studies have shown students to reference assistance in goal setting and career preparation as benefits of using micro-credentialing. Micro-credentialing offers an exciting way to build a portfolio of digital badges which will benefit students and employees when looking for opportunities on the job market. Digital badges and certificates are easily added to LinkedIn and other professional websites, allowing employers to see and verify them much faster. Collection and analyses of more data will inform us whether students with extensive digital portfolios experience greater success during their academic training, gaining employment, and achieving success on the job (Mathur et al., 2018). Research can also help determine whether employers can recognize digital badges as an acceptable, transferable, and flexible method to conclude if an applicant is fit for the job.

Course-based and Program Initiatives

Digital badging has been implemented in credit-based courses and various program initiatives. As an innovative form of education certification, a digital badge is an online assessment and accreditation mechanism (Grant, 2016). Badges can be integrated into individual courses at higher education institutions. Blended learning and face-to-face learning can work well together by implementing the use of digital badges. Other institutions have implemented digital badging to prepare and identify students for a faculty-student mentoring program. Faculty members see the value of badges beyond the classroom. Faculty-student mentoring programs are geared to support help students and improve career readiness. When applying digital badging, the mechanism is used to document professional development and assist in outreach and marketing activities (Stefaniak & Carey 2019). Employers use digital badging to identify potential candidates for internship and employment opportunities. Badges also can strengthen traditional degree programs and link badge earners to potential employers and professional organizations (Wilson et al., 2016). Digital badges are an informal way of tracking student learning outcomes and performance.

Summary

This literature review has explored the numerous opportunities digital badging has to offer in higher education. Digital badging has been shown to foster student engagement and motivation. Digital badging is a form of micro-credentialing which indicates specific skills and professional development achievement for students. Research on digital badging in course-based and program initiatives has supported positive outcomes in higher education. The implementation of digital badging in programs such as faculty-student mentoring promotes

student self-efficacy. Digital badging, while it has its advantages on student engagement in higher education research, has shown gaps and limitations. Further research is needed to explore the advantages and disadvantages when it comes to the impact of digital badging in higher education.

Chapter 3: Methodology

Introduction

Various forms of gamification can be applied in higher education with success. Digital badging is a growing trend in higher education that can help educators and faculty mentors foster student engagement and participation. The utilization of digital badges is recommended not only as a credentialing instrument but also as an assessment tool in higher education (Zhou et al., 2019). This quantitative study will attempt to identify the relationship between digital badging in a faculty-student mentoring program and student participants' grade point average, attitudes toward digital badging, and impacts on internal and external internship opportunities. Data collected from this study will provide direction for educators on implementing digital badging at their institutions and their and future research in the field.

Research Design

The purpose of this quantitative study is to identify the impact digital badging has on the student participants of the faculty-student mentoring program at New Jersey City University. Creswell and Guetterman (2018), state a cross-sectional survey design aims to collect from one point in time. The data from this study will be collected at the end of the faculty-student mentoring program. This correlational research will attempt to establish the range of a relationship between two or more variables using statistical data that is collected. This study will identify the relationship between the number of digital badges earned and student grade point average. The data will also help identify patterns between students who have earned badges and if a student could secure internal or external internships. The researcher will analyze student attitudes toward career readiness and graduation as a result of digital badging.

Population and Sample

A population is a group chosen with characteristics that distinguish them from other groups (Creswell & Guetterman, 2018). The population selected for this research study are participants of a faculty-student mentoring program with a digital badging system in STEM departments at an institution of higher education. The target population is the group of individuals the researcher will work with (Creswell & Guetterman, 2018). This study's target population are the participants from the 2020-2021 STEM faculty-student mentoring program cohort at New Jersey City University. The researcher will have access to the faculty-student mentoring program roster, which enrolls 80 students. The researcher will employ online surveys due to the quick and inexpensive ability to gather data from the population. Convenience sampling will be used based on participants' convenience and availability (Creswell & Guetterman, 2018). New Jersey City University has a diverse population of students and provides access to the technology needed to complete this survey.

Instrument

After a careful review of literature and case studies on implementing digital badging in higher education, no adaptable survey was usable for this research study. The survey for this quantitative study needed to be created (Appendix A). The first four questions on the survey will collect demographic information about the participants. The following four questions will help determine how many internal and external internships they have applied for and how many they have been able to secure. The last question utilizes a five-point Likert scale to determine their attitudes on digital badging and the impacts it has had on their career readiness, graduation, and whether they believe others would benefit from digital badging.

The survey (Appendix A) will then be converted into a Qualtrics form emailed to the participants to gather data for this research study.

Procedure

This study's procedure is as follows; first, we must apply for approval from the New Jersey City University Internal Review Board. Once NJCU IRB approves, outreach begins to the Activity Director of NJCU's STEM faculty-student mentoring program to request the list of participants and their email addresses (Appendix C). An email (Appendix B) will be sent to the 80 participants, explaining the study and inviting them to participate. The email (Appendix B) will be distributed on the last day of the faculty-student mentoring program, with a request to complete the survey within 10-days. After the deadline has passed and participation is low, there will be a reminder and extension granted for additional participants. Once data collection is complete, the data will be imported from Qualtrics into an excel spreadsheet to study and analyze. The analysis of the data will answer the research questions that guide this quantitative study:

RQ1: What is the relationship between the number of digital badges a college-level STEM student mentee earns and their grade point average (GPA)?

RQ2: What percentage of college-level STEM students with a faculty mentor who earn digital badges secure internal/external internship opportunities?

RQ3: What is the relationship between digital badging and college-level STEM student attitudes towards career readiness and graduation?

References

Abramovich, S., & Wardrip, P. (2016). Impact of Badges on Motivation to Learn. In Muilenburg, L.Y. & Berge, Z.L., (Eds.), *Digital Badges in Education: Trends, Issues, and Cases*; (pp. 53–61).

Byars-Winston, A. & Dahlberg, M. L. (2019). *The Science of Effective Mentorship in STEMM*. National Academies Press.

Campillo-Ferrer, J., Miralles-Martínez, P., & Sánchez-Ibáñez, R. (2020). Gamification in higher education: Impact on student motivation and the acquisition of social and civic key competencies. *Sustainability, 12*(12), 4822. doi:10.3390/su12124822

Creswell, J. W., & Guetterman, T. C. (2018). *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research* (6th ed.). Pearson.

Dichev, C., & Dicheva, D. (2017). Gamifying education: What is known, what is believed and what remains uncertain: A critical review. *International Journal of Educational Technology in Higher Education, 14*(1). doi:10.1186/s41239-017-0042-5

Dyjur, P., & Lindstrom, G. (2017). Perceptions and uses of digital badges for professional learning development in higher education. *TechTrends, 61*(4), 386-392. doi:10.1007/s11528-017-0168-2

Fields, E. (2015). Making visible new learning: Professional development with open digital badge pathways. *Partnership: The Canadian Journal of Library and Information Practice and Research, 10*(1). doi:10.21083/partnership. v10i1.3282

Grant, S.L. (2016). Impact of Badges on Motivation to Learn. In Muilenburg, L.Y. & Berge, Z.L., (Eds.), *Digital Badges in Education: Trends, Issues, and Cases*; (pp. 3–11).

Mathur, A., Wood, M. E., & Cano, A. (2018). Mastery of transferrable skills by Doctoral Scholars: Visualization using Digital MICRO-CREDENTIALING. *Change: The Magazine of Higher Learning, 50*(5), 38-45. doi:10.1080/00091383.2018.1510261

Stefaniak, J., & Carey, K. (2019). Instilling purpose and value in the implementation of digital badges in higher education. *International Journal of Educational Technology in Higher Education, 16*(1). doi:10.1186/s41239-019-0175-9

Wilson, B. G., Gasell, C., Ozyer, A., & Scrogan, L. (2016). Adopting digital badges in higher education: Scoping the territory. *Foundation of Digital Badges and Micro-Credentials,* 163-177. doi:10.1007/978-3-319-15425-1_9

Zhou, L., Chen, L., Fan, Q., & Ji, Y. (2019). Students' perception of using digital badges in blended learning classrooms. *Sustainability, 11*(7), 2151. doi:10.3390/su11072151

Appendix A

1. What is your academic standing at NJCU?

    - Freshman
    - Sophomore
    - Junior
    - Senior

2. How many college credits have you earned at NJCU?
    - 0-30 credits
    - 31-60 credits
    - 61-94 credits
    - 95+ credits

3. What is your cumulative grade point average (CGPA)?
    - 4.0
    - 3.5
    - 3.0
    - 2.5
    - 2.0
    - <2.0

4. How many digital badges have you earned?
    - 1
    - 2
    - 3
    - 4
    - 5+

5. How many internal internships have you applied for?
    - 1
    - 2
    - 3
    - 4
    - 5+

6. Of those internal internships you have applied for, how many have offered you the internship?
    - 1
    - 2
    - 3
    - 4
    - 5+

7. How many external internships have you applied for?
    - 1

- 2
- 3
- 4
- 5+

8. Of those external internships you have applied for, how many have offered you the internship?
   - 1
   - 2
   - 3
   - 4
   - 5+

9. Indicate how much you agree with the following statements:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Digital badging has provided me with the opportunity to acquire the knowledge and skills needed to apply for internal and external internships.					
Digital badging has allowed me to acquire knowledge and skills, which has strengthened my confidence.					
Digital badging has provided me with the opportunity to acquire the knowledge and skills needed to prepare and plan for my career					
Digital badging provided me with the opportunity to acquire the knowledge and skills needed to stay on track to graduation.					
Digital badging would be beneficial to your classmates who have not participated in the faculty-student mentoring program.					

Appendix B

July 10, 2021

Dear Mentees,

The NJCU faculty-student mentoring program has implemented a digital badging system. There has been an increase and interest in research regarding the implementation of digital badging into mentoring programs. As a result, I will be conducting a study, which aims to identify the relationship between digital badging and the impact it has in a faculty-student mentoring program and student participants' grade point average, attitudes toward digital badging, and impacts on internal and external internship opportunities.

Participation in this study is voluntary and anonymous. By completing the online survey, you are consenting to the use of your responses in this study. **The survey will only take about 5-10 minutes of your time to complete and must be completed by April 15, 2021.**

Survey Link

If you have any concerns or questions, feel free to contact me by email or phone. You can also contact, Dr. Christopher Carnahan, at ccarnahan@njcu.edu or the NJCU Institutional Review Board.

Sincerely,

Kristina Harb

Proyecto STEM, Grant Assistant

New Jersey City University

Email: kharb@njcu.edu

Office: 201-200-2143

Appendix C

July 10, 2021

Dear Dr. Reed Caroll,

My name is Kristina Harb and I am the Proyecto STEM, Grant Assistant and a doctoral student in the Educational Technology Leadership Program at New Jersey City University. There has been an increase and interest in research regarding the implementation of digital badging into mentoring programs. I am seeking your permission to conduct a study with your program on digital badging in a mentoring program. The study aims to identify the relationship between digital badging and the impact it has in a faculty-student mentoring program and student participants' grade point average, attitudes toward digital badging, and impacts on internal and external internship opportunities.

Student participation in this study is voluntary and anonymous. I would only need the list of your faculty-mentor program mentees and their email addresses to distribute the survey. I have included the student recruitment email that will be sent to invite students to participate and the Survey Link for your reference.

If you have any concerns or questions, feel free to contact me by email or phone. You can also contact, Dr. Christopher Carnahan, at ccarnahan@njcu.edu.

Sincerely,

Kristina Harb

Proyecto STEM, Grant Assistant

New Jersey City University

Email: kharb@njcu.edu

Office: 201-200-2143